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What Drives Enrollment Gaps in Further Education?

The Role of Beliefs in Sequential Schooling Decisions

Chris Belfield, Teodora Boneva, Christopher Rauh and Jonathan Shaw*

January 2019

Abstract

We study students' motives to obtain sixth form and university education in a sample of 885 secondary school students in the UK. At each educational stage, perceptions about the consumption value of education explain a substantial share of the variation in students' intentions to obtain further education, while beliefs about the monetary benefits and costs are not found to play an important role. Beliefs about the consumption value of university not only predict students' intentions to go to university but also their intentions to go to sixth form, highlighting the importance of dynamic considerations in the choice. We further document that students' beliefs about the consumption value of further schooling strongly predict students' perceptions about how likely it is they will obtain the necessary grades to proceed to the next educational stage. Differences in the perceived consumption value across gender and socio-economic groups can account for a sizeable proportion of the gender and socio-economic gaps both in students' intentions to pursue further education as well as in their perceptions about their own performance.

Keywords: beliefs, sequential schooling decisions, gender, socio-economic inequality

JEL classifications: I24, I26, J13, J24, J62

**Affiliations:* Chris Belfield: Institute for Fiscal Studies; Teodora Boneva: University of Oxford; Christopher Rauh (corresponding author): University of Montreal, CIREQ; Jonathan Shaw: Institute for Fiscal Studies. This paper has been previously circulated as 'Money or Fun? Why Students Want to Pursue Further Education'. We are very grateful to the editor and the anonymous referees, Orazio Attanasio, Flavio Cunha, James J. Heckman, Costas Meghir, Rajesh Ramachandran, Jack Willis and ESA Conference participants for providing us with valuable comments. We are grateful to the ESRC Centre for the Microeconomic Analysis of Public Policy (CPP) (ES/H021221/1) for funding this project and Claire Crawford for her involvement in designing the survey. Boneva acknowledges financial support from the British Academy.

Traditional models of human capital view education as an investment where the financial and opportunity costs of education are compared to the discounted stream of expected future benefits, primarily in the form of increased future earnings. While the investment value of education has been the primary focus of most of the theoretical and empirical literature, early theoretical work emphasizes the importance of the consumption value of education in individual schooling decisions (Lazear 1977, Kodde and Ritzen 1984).¹ The consumption value of education consists of different non-pecuniary benefits and costs associated with being in full-time education such as the (dis)utility from acquiring new skills, experiencing new things and places, socializing with new people, or participating in social events and student activities. While recent work has established the importance of individual beliefs about the pecuniary returns to education in educational investment decisions (e.g. Jensen 2010; Attanasio and Kaufmann 2014; Kaufmann 2014), not much is known about the importance of the perceived consumption value of education in the decision to obtain further education.

When studying the importance of different motives in educational investment decisions, it is further important to take the dynamic nature of the decision problem into account. While traditionally educational decisions made at different stages have been examined in isolation, it is important to acknowledge that education acquired at early stages can open opportunities for educational attainment at later stages. Recent empirical work has established that the continuation values associated with dynamic sequential schooling choices are empirically important components of the causal effects of schooling (e.g. Stange 2012; Heckman, Humphries and Veramendi 2018). Yet little is known about whether students take the option value of further education into account when making their educational decisions.

¹Different studies have documented the positive impact of educational attainment on different later-life outcomes such as labor market, health, marriage, and crime outcomes (e.g., Card 1999, Heckman, Stixrud and Urzua 2006, Oreopoulos and Salvanes 2011, Oreopoulos and Petronjievic 2013, Heckman, Humphries and Veramendi 2018).

In this paper, we fill these gaps in the literature. We examine the role of beliefs about the pecuniary and non-pecuniary benefits and costs of education in students' decisions to pursue further education in a setting in which schooling decisions are made sequentially. Given that observed choices are consistent with many different combinations of preferences and beliefs (Manski 2004), it is not possible to study the role of beliefs using choice data alone. For this reason, we elicit student beliefs in a new survey of 885 secondary school students in the UK (ages 13-14) which allows us to examine the role of beliefs in two critical sequential educational decisions. In particular, after completing eleven years of compulsory school education (ages 5-16), which at the end of year 11 lead to the General Certificate of Secondary Education (GCSE), students need to make their first important educational decision. They can either opt to remain in school for an additional two-year period, which is commonly referred to as 'sixth form' (ages 16-18), or they can decide to leave school.² These two additional years of schooling typically lead to A-level qualifications (similar to a high school diploma in the US). Once students have obtained their A-level qualifications, they are faced with the second far-reaching decision; they need to decide whether to go to university or not. In the UK, about 82% of students aged 16-18 years are enrolled in full-time education, while 48% of a given cohort of students continues to higher education (Department for Education 2016, 2017). Given the gravity of these two educational decisions for students' later-life outcomes, it seems crucial to understand what drives these educational investment decisions.

Studying students' motives to pursue further education at these two critical stages is also important in light of the large gender and socio-economic gaps in students' educational decisions.³ Conditional on measures of cognitive and noncognitive skills, female students in the UK are almost 9 percentage points more likely to go to sixth form and obtain A levels and 3 percentage points more likely to attend university conditional on having obtained A levels compared to male students. Students with at least one parent holding a university degree are 20 percentage points more likely to obtain A levels and 6 percentage points more likely to attend university conditional on having obtained A levels compared to students with less well educated parents.⁴ Using the rich data we collect, we explore whether beliefs about the pecuniary and non-pecuniary benefits and costs of education differ across gender and socio-

²If students decide to leave school after year 11, they are still required to engage in some training activities until the age of 18 (e.g. in the form of apprenticeships or traineeships) but these other forms of training typically do not lead to A-level qualifications that would allow students to apply to university.

³See Machin and McNally (2005), Goldin, Katz and Kuziemko (2006), Vincent-Lancrin (2008) and Fortin, Oreopoulos and Phipps (2015) for evidence on the gender gap and Blanden and Gregg (2004) and Blanden and Machin (2004) for evidence on the socio-economic gap in university attendance. Recent statistics show that males in the UK are less likely to apply to higher education than females are likely to enter (UCAS 2014) and the gender gap has now reached a record high (UCAS 2017).

⁴We use data from the British Household Panel Study (BHPS) and the UK Longitudinal Household Study (UKLHS) to calculate the gaps in university attendance conditional on skills. The results of this analysis are reported in Table A.1 in Appendix A.

economic groups, and we investigate to what extent differences in these beliefs can explain the gender and socio-economic gaps in individual intentions to attend sixth form and university.

Another important and related question we study is whether students' beliefs about the benefits and costs of education predict students' perceptions about their own performance. Students who perceive the benefits of further education to be higher may exert more effort to obtain the grades which are necessary to continue to the next educational stage. We are especially interested in whether differences in beliefs about the benefits of further education can explain the gender and socio-economic differences in students' perceptions about their likely performance. In the UK, female students and students from high socio-economic status backgrounds are more likely to perform better in school (Sammons et al. 2014).

The data we collect contains detailed information on (i) students' perceptions about the likelihood of obtaining the grades to pursue further education, (ii) students' beliefs about the likelihood of continuing to further education if they get the grades, as well as (iii) detailed information on students' beliefs about the pecuniary and non-pecuniary benefits and costs of education. We elicit those beliefs separately for sixth form and university education. To elicit beliefs about the pecuniary returns to sixth form and university education, we use hypothetical investment scenarios (e.g. Dominitz and Manski 1996; Manski 2004; Cunha, Elo and Culhane 2013; Attanasio and Kaufmann 2014; Boneva and Rauh 2018). To elicit beliefs about the non-pecuniary benefit of being in full-time education (i.e. the consumption value), we follow the approach which is standard in the literature and use probabilistic questions (see Manski 2004; Zafar 2013; Giustinelli 2016).⁵ In particular, we ask students to state how likely they think it is that they would enjoy going to sixth form and how likely it is that they would enjoy going to university (0-100%). We also elicit students' perceptions about how much they would have to pay in tuition fees if they decided to go to university.

The contribution of this paper can be summarized in terms of four main findings. First, we document that the perceived consumption value plays a very prominent role in students' plans to continue in full-time education. In fact, the perceived consumption value *alone* can explain 43% of the variation in students' intentions to go to sixth form and 51% of the variation in students' intentions to go to university (see Figure 1). Consistent with the results in the existing literature (e.g. Jensen 2010; Attanasio and Kaufmann 2014; Kaufmann 2014), we also document that individual beliefs about the

⁵In comparison, vaguely worded qualitative questions have been shown to provide little useful information about respondents' expectations (e.g., Manski 1990; Juster 1966). See Manski (2004) for a review and discussion of different survey elicitation approaches.

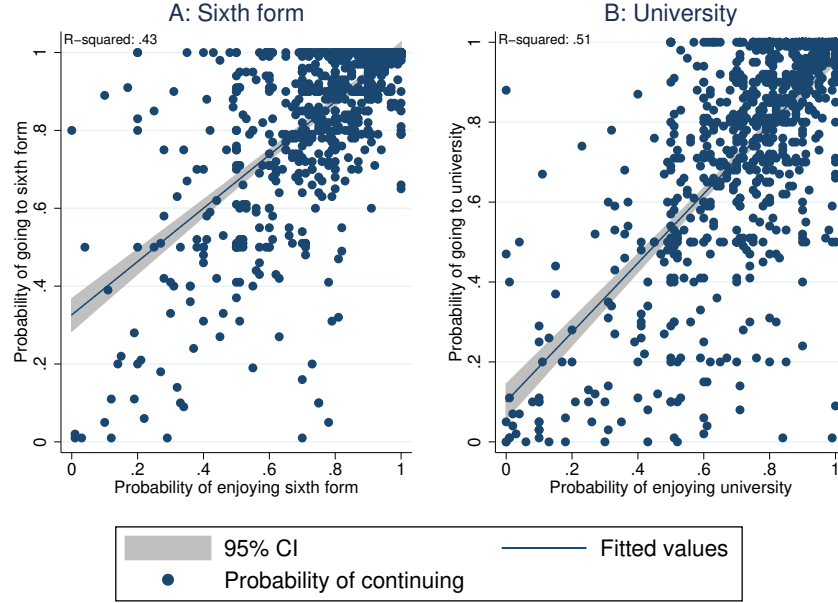
pecuniary returns to education are associated with students' plans to continue in full-time education. Our analysis reveals, however, that students' beliefs about the pecuniary returns to education can explain a much smaller share of the variation in students' intentions to continue in full-time education compared to the perceived consumption value. Interestingly, we do not find any evidence that students' beliefs about tuition costs play a role in their decisions. These results are consistent with the fact that participation rates in higher education have not markedly dropped after the introduction of higher university tuition fees (Department for Education 2016).

Second, we document that students take the dynamic nature of the decision problem into account when deciding whether or not to obtain further schooling. When deciding whether or not to go to sixth form, both students' perceptions about the benefits of sixth form as well as beliefs about the benefits of university education play an important role. Students who perceive the pecuniary returns or the consumption value of university education to be larger are significantly more likely to plan to go to sixth form.

Third, having established the importance of the perceived consumption value in students' choices, we document that student beliefs about the consumption value are heterogeneous and that they differ systematically across gender and socio-economic groups. Female students perceive both the consumption value of sixth form and the consumption value of university to be a quarter of a standard deviation higher. Turning to the socio-economic gap in the perceived consumption value, we document that students who have at least one parent with a university degree on average perceive the consumption value of sixth form to be 0.15 standard deviations higher compared to students with less well educated parents, while on average they perceive the consumption value of university to be 0.29 standard deviations higher. Once we control for the perceived consumption value of further education, we can explain a substantial share of both the gender gap as well as the socio-economic gap in students' intentions to continue in further education. For example, once we control for the perceived consumption value of university we no longer find a gender gap in students' stated intentions to go to university, we no longer find an income gradient, and the coefficient on parental education is reduced by approximately half. We further investigate whether the perceived consumption value of further education plays a larger role in the decision to continue in full-time education for some groups compared to others. We find no significant differences by gender, which suggests that students of different genders place a similar weight on the consumption value when making their decision. In contrast, we do find significant differences by parental education. Students with lower educated parents place a significantly larger

weight on the perceived consumption value, both in their intention to go to sixth form as well as in their intention to go to university. Taken together, students from low socio-economic backgrounds not only perceive the consumption value of further education to be lower, but this perceived consumption value also exerts more weight in their intentions to pursue further education.

Figure 1: Perceived Consumption Value and Perceived Probability of Continuing in Education



Note: Panel A plots the perceived probability of going to sixth form (conditional on getting the grades to go to sixth form) against individual perceptions of how likely it is that they will enjoy sixth form. Panel B plots the perceived probability of going to university (conditional on getting the grades to go to university) against individual perceptions of how likely it is that they will enjoy university.

Fourth, we investigate whether beliefs about the benefits and costs of further education are related to students' beliefs about their own performance, and we find that students' beliefs about the consumption value of sixth form as well as the consumption value of university significantly predict students' beliefs about the likelihood of getting the grades for sixth form. Similarly, students' beliefs about the consumption value of university significantly predict students' beliefs about the likelihood of getting the grades for university. The results are consistent with a story in which students exert more effort in school to achieve higher grades if they believe that by getting the grades they can pursue further education from which they derive a high consumption value. We do not find that students' perceptions about the monetary returns to sixth form or university are significant predictors of the perceived likelihood of getting the required grades. Interestingly, we document that controlling for

perceptions about the consumption value of further education significantly reduces the gender and socio-economic gaps in students' perceptions about the likelihood that they will receive the necessary grades to pursue further education.

This study contributes to several different strands of the literature. First, our study contributes to the growing literature which investigates the role of individual beliefs about the pecuniary returns to education in explaining educational attainment. While traditional theories generally assumed perfect information about pecuniary returns (e.g. Becker 1964), the recent literature has documented that beliefs about pecuniary returns are decisive determinants of individual schooling decisions (Jensen 2010, Attanasio and Kaufmann 2014, Kaufmann 2014). We contribute to this literature by documenting how student beliefs about pecuniary returns to education impact sequential schooling decisions, which have been the focus of recent empirical work (e.g. Stange 2012; Heckman, Humphries and Veramendi 2018). We show that both the perceived benefits to sixth form as well as the perceived benefits to university are significant predictors of students' intentions to attend sixth form, indicating that students take the option value of sixth form education into account.

Second, our study relates to the literature which investigates how beliefs about pecuniary and non-pecuniary benefits affect students' choice of major (Zafar 2013; Wiswall and Zafar 2015*a,b*, 2016, 2018),⁶ high-school track (Giustinelli 2016), and which specific university to attend (Delavande and Zafar forthcoming). In contrast to these studies, our analysis focuses on students' decisions to continue in further education (i.e. the extensive margin) rather than which specific major, high-school track or university to choose.

To the best of our knowledge, we are the first to study the role of students' beliefs in students' decisions to obtain both sixth form and university education, to study the role of beliefs in explaining the gender and socio-economic gaps in these decisions, and to use data on beliefs to investigate the role of dynamic considerations in a setting in which educational decisions are made sequentially. We demonstrate that students' beliefs about the consumption value of university not only strongly predict students' intentions to go to university but also students' intentions to go to sixth form. These results provide valuable insights into the motives of students to pursue sixth form education, and they are highly policy-relevant in light of the large gender and socio-economic gaps which open up at this early stage and subsequently exacerbate the gap in university attendance and later-life outcomes. Closest

⁶Other work investigating the role of different motives in major choice includes Montmarquette, Cannings and Mahseredjian (2002); Arcidiacono (2004); Arcidiacono, Hotz and Kang (2012); Beffy, Fougere and Maurel (2012); Arcidiacono et al. (2014); Stinebrickner and Stinebrickner (2014*a*).

to our study is recent work by Boneva and Rauh (2017) who, using data from a different survey and sample of students, exclusively focus on students' decisions to go to university and also find that beliefs about non-pecuniary benefits are important in this decision and contribute to the socio-economic gap. Finally, our results shed new light on what may explain both the gender and socio-economic gaps in student performance. We document that students' beliefs about the consumption value of further education strongly predict students' beliefs about how well they will perform in school, and that differences in beliefs about the consumption value can account for a sizeable share of the gender and socio-economic gaps in students' beliefs about their own performance.

This paper proceeds as follows: Section 1 presents the theoretical framework and describes our survey design. Section 2 presents the characteristics of the data, while Section 3 presents the results of the analysis. Section 4 provides a discussion of the findings and supplementary evidence, while Section 5 concludes.

I Methodology

Theoretical Framework

In the following, we present a theoretical framework that describes a sequential model of schooling. We use this theoretical framework to highlight which beliefs are likely to be critical in students' decisions and to motivate our survey design.

Consider a multistage sequential model of education with transitions and nodes shown in Figure 2. Let $S \in \{s_1, s_2, s_3\}$ denote the set of possible terminal states. In particular, students can either drop out after year 11 (s_1), go to sixth form but not to university (s_2), or go to university (s_3). There are two nodes, $j \in \{1, 2\}$, at which students can decide whether to continue in full-time education or leave full-time education. In addition, there are two nodes, $k \in \{I, II\}$, at which students may or may not obtain the necessary grades to continue in full-time education. We assume that students can choose how much effort to exert in school, and that grades are a function of effort as well as other factors which students have no control over.

For each student i , we denote the individual probability of getting a job in each terminal state as $p_i \in \{p_{1i}, p_{2i}, p_{3i}\}$ and individual earnings conditional on having a job as $Y_i \in \{Y_{1i}, Y_{2i}, Y_{3i}\}$.⁷ We

⁷Note that we do not have information on students' beliefs about the variance in earnings (conditional on having a job). We therefore treat individual earnings conditional on having a job as deterministic both in the model as well as in the analysis.

define the pecuniary returns to sixth form (PR_i^{SF}) and university education (PR_i^{uni}) as:

$$PR_i^{SF} = \frac{p_{2i}Y_{2i}}{p_{1i}Y_{1i}} - 1 \quad \wedge \quad PR_i^{uni} = \frac{p_{3i}Y_{3i}}{p_{2i}Y_{2i}} - 1.$$

If a student decides to pursue further education at node j a consumption value is realized. We denote the consumption value of going to sixth form as CV_i^{SF} and the consumption value of going to university as CV_i^{uni} . Finally, if the student decides to go to university, the student will need to pay tuition costs TC_i^{uni} .

When students make educational decisions they may not know the benefits and costs associated with continuing in full-time education. Instead, they may form beliefs about the benefits and costs and base their decisions on these beliefs. When students decide whether or not to go to university, we expect students' decisions to be affected by their beliefs about the pecuniary returns to university education, PR_i^{uni} , the consumption value of university education, CV_i^{uni} , as well as the tuition costs of university, TC_i^{uni} . When students decide whether or not to go to sixth form, we do not only expect their decisions to be affected by their beliefs about the pecuniary returns to and the consumption value of sixth form, PR_i^{SF} and CV_i^{SF} , but also by their beliefs about the benefits and costs of university education. Given the sequential nature of the decision problem, going to sixth form opens up educational opportunities at later stages. If students are forward-looking, we expect them to take the option value of sixth form education into account when deciding whether to stay in full-time education after year 11.

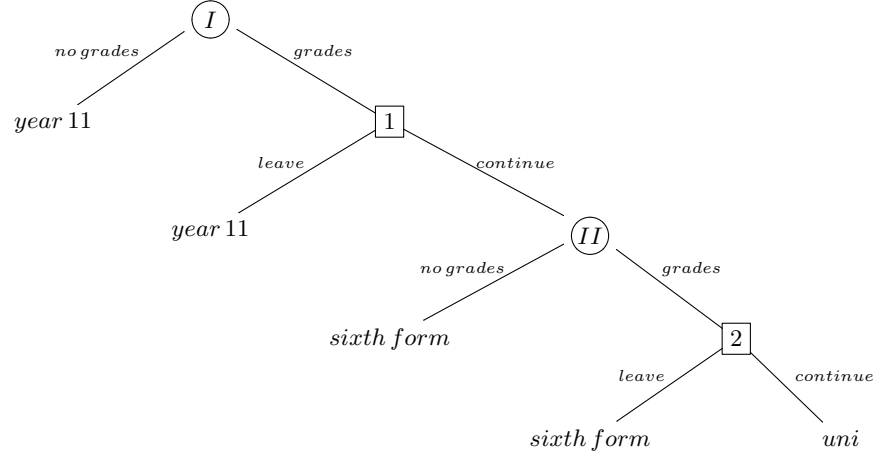
While beliefs about the benefits and costs of further education are likely to play an important role in students' decisions to pursue further education at nodes $j \in \{1, 2\}$, they may also influence the amount of effort students decide to exert in nodes $k \in \{I, II\}$. If students perceive the returns to further education to be high, they will have a higher incentive to exert effort in order to achieve the required grades which will allow them to pursue further education. If students are forward-looking, we expect that their beliefs about the benefits and costs of university education also already play a role in their decisions of how much effort to exert to obtain the grades to continue to sixth form.

Elicitation of Beliefs

To gain a better understanding of how students make educational choices, we elicit student beliefs, guided by the theoretical framework described in Section 1.1.⁸ First, we elicit student beliefs about four different conditional probabilities. In particular, we ask students to state how likely they think it

⁸The questionnaire we designed to elicit student beliefs can be found in Appendix B.

Figure 2: A Multistage Dynamic Education Problem



Note: This figure depicts the multistage dynamic education problem. If the student does not get the grades to go to sixth form or does not choose to go to sixth form despite getting the grades, the student's highest level of education is year 11. If the student reaches decision node 1 and decides to go to sixth form, then the student's highest level of education is either sixth form or university, depending on whether the student obtains the grades to go to university and decides to continue to university in decision node 2.

is that they will (i) get the grades in year 11 to continue to sixth form, (ii) go to sixth form if they get the grades in year 11, (iii) get the grades in sixth form to continue to university, and (iv) go to university if they get the grades in sixth form. By eliciting students' intentions to continue in further education *conditional* on getting the grades, we have measures of students' willingness to continue in further education which are not conflated with students' beliefs about the likelihood of getting admitted. Similar to previous studies, we focus our analysis on beliefs about intended behavior rather than choices (e.g. Bleemer and Zafar 2018), which have been shown to be strong predictors of actual future educational decisions (e.g. Jacob and Linkow 2011, Beaman et al. 2012). This allows us to ask all questions *prospectively* rather than retrospectively, which helps us minimize potential biases that could arise due to cognitive dissonance or ex-post rationalization (Festinger 1957, Bertrand and Mullainathan 2001, Benitez-Silva et al. 2004, Zafar 2011). As advocated in previous studies (e.g. Blass, Lach and Manski 2010, Stinebrickner and Stinebrickner 2014a, Wiswall and Zafar 2015a), we also allow students to express uncertainty about their future choices by asking them to state how likely they believe it is that they will continue in full-time education on a 0-100% scale. Given that students may be subject to different shocks that may not have been realized yet at the time of the survey, it is important to allow students to express this uncertainty.

Second, we elicit students' beliefs about their expected earnings at age 25 using hypothetical invest-

ment scenarios, a method pioneered by Dominitz and Manski (1996) and used successfully in different studies such as Kaufmann (2014) and Attanasio and Kaufmann (2014). As noted in the previous literature, one problem with asking students about the expected earnings in a specific scenario is that there is some uncertainty concerning whether students respond to these questions unconditionally or conditional on having a job. We therefore ask students to state how likely they think it is that they will have a job at age 25 and what they expect their earnings to be at age 25 conditional on having a job (i) if they do not continue in full-time education after year 11, (ii) if they go to sixth form but not to university, and (iii) if they go to sixth form and to university.⁹ Using students' responses to these questions, we can calculate each students' perceived pecuniary returns to sixth form (PR_i^{SF}) and university education (PR_i^{uni}), as described in Section 1.1.

Third, we elicit students' beliefs about the consumption values of further education using probabilistic questions. Such questions have the advantage that responses are interpersonally comparable and more informative than responses on a Likert-scale (Manski 2004). In particular, we ask students how likely they think it is they would enjoy going to sixth form, and how likely they think it is they would enjoy going to university on a 0-100% scale.¹⁰ We use the responses to these questions as measures of the individual perceived consumption values of further education, CV_i^{SF} and CV_i^{uni} .¹¹ Similar questions have been used in the literature which examines the importance of non-pecuniary benefits in students' choice of major (e.g. Zafar 2013), students' choice of high school track (e.g. Giustinelli 2016), students' choice of which specific university to attend (e.g. Delavande and Zafar forthcoming) and students' decision to drop out from college (e.g. Stinebrickner and Stinebrickner 2014b).¹² As is standard in the literature, the subjective probability questions are preceded by a section which explains the use of the 0-100% chance scale and which asks respondents to answer a warm-up question.¹³

⁹While different educational decisions are likely to manifest themselves in different levels of lifetime earnings, we chose to ask students about their expected earnings at a specific point in time (rather than about their expected lifetime earnings) because this question is more intuitive and easy to understand. Moreover, students might find it more difficult to imagine their future earnings at a point in time too distant in the future, which is why we chose to ask students about their expected earnings at age 25 and not at an older age.

¹⁰We note that this question can be interpreted as measuring the likelihood of a binary outcome occurring or the likelihood of the realization of a latent continuous variable lying above a certain threshold. Regardless of the interpretation, the question allows students to express uncertainty about university being enjoyable. While students may also differ in their beliefs about the distribution of the latent continuous variable in ways we are not capturing, measuring students' beliefs about *how much* students enjoy further education as well as the distribution of this continuous variable is challenging as there is no natural metric for 'enjoyment'.

¹¹While we focus on students' perceptions about how likely it is that they would enjoy being in full-time education, it would also be interesting to explore whether students differ in their beliefs about being out of school. In this paper we abstract from potential differences in beliefs about the non-pecuniary benefits of being out of school.

¹²For example, Zafar (2013) uses the question '*If you were majoring in [X], what do you think is the percent chance that you will enjoy the coursework?*'. Similarly, Giustinelli (2016) asks '*What did you think would be the chances out of 100 that you would enjoy the content of the following curricula, should you enrol in each one of them?*'.

¹³The questionnaire text can be found in Appendix B. The warm up question used is 'What do you think is the percent chance that it will rain tomorrow?'.

Finally, to obtain a measure of students’ beliefs about the likely tuition costs of university education, TC_i^{uni} , we ask students to state how much they believe they would have to pay in tuition costs per year if they decided to go to university.

II The Data

The survey data was collected online by the professional survey company Kantar Public UK (formerly TNS-BMRB) in July/August 2013. To be eligible to participate in the survey, students had to currently be in year 9 of secondary school. The students who participated in this survey were members of the company’s Kids Omnibus panel who agreed to participate in this study. To increase the reliability of household level information, all household level variables (e.g. household income) were reported by parents.

The Sample

Our sample consists of 885 students who were in year 9 at the time of the survey. The characteristics of the sample are reported in Table 1. The students in our sample are on average 13.8 years old and 45% are female. 46% have at least one parent who holds a university degree, while 21% are raised in single parent households. The average number of children in the household is 2.53. On average, total household income is £34,877.

We also have information on the students’ time and risk preferences. To elicit students’ time and risk preferences, we administer two questions which ask students to state how patient and how risk loving they are in general on a scale from 0 to 10 (see Appendix B). These qualitative measures of time and risk preferences have been shown to predict behavior in incentivized experiments (Dohmen et al. 2011; Vischer et al. 2013; Vieider et al. 2015; Falk et al. 2016), and they have been administered and used successfully in large representative samples in the past (e.g. Dohmen et al. 2012; Falk et al. 2018). In our sample, the average response to the patience question is 7.14, while the average response to the risk question is 7.21.

For a subsample of respondents, we can link our survey data to data from the National Pupil Database (NPD), which contains information on students’ performance on standardized tests. 49% of all parents consented to data being matched to the NPD data, and out of those cases 64% of the matches were successful, so we have matched data for 31% of the respondents in our sample ($N = 277$). We note that respondents in the subsample are slightly older, less patient, and less likely to have a

parent with a university degree compared to the entire sample but that they are similar in terms of other individual and household characteristics that we measure (see the last two columns of Table 1).

Table 1: Descriptive Statistics of Sample

	Sample		Matched to NPD		Difference	p-value
	Mean	[SD]	Mean	[SD]		
Age of child	13.80	[.56]	13.87	[.44]	-.07	.06
Female child	.45	[.5]	.42	[.49]	.03	.38
Patience	7.14	[2.23]	6.74	[2.31]	.40	.01
Risk	7.21	[2.05]	7.01	[2.06]	.20	.16
Parents with university degree	.46	[.5]	.38	[.49]	.08	.02
Single parent	.21	[.41]	.23	[.42]	-.02	.48
Number of children in HH	2.53	[1.4]	2.56	[1.3]	-.03	.75
Household income	34877.49	[26099.18]	32333.01	[25950.08]	2544.48	.16
Observations	885		277			

Note: This table reports the mean and standard deviation of student characteristics such as gender and age, as well as self-reported patience and risk attitudes, and household characteristics such as whether at least one parent has a university degree, whether the child is taken care of by a single parent, the number of children in the household, and household income. Household income refers to the household's total income, after tax and any other deductions. The first two columns describe the entire sample, whereas the columns (3) and (4) describe the subsample matched successfully to the NPD. The fifth column presents the difference in means while the sixth column presents the p-value of this difference.

Compared to a representative sample of households in the UK with at least one child aged 12-15, the parents of the children in our sample are somewhat better educated and less likely to be single parents. Figure A.2 in the Appendix shows the distribution of annual household income for households in our sample and households in the Family Resources Survey (FRS).¹⁴

Elicited Beliefs

Table 2 presents average student beliefs for our whole sample (column 1) as well as separately by gender and parental education (columns 2-5). On average, students in our sample believe that with a probability of 78% they will get the grades in year 11 to continue to sixth form.¹⁵ Moreover, they believe that with a probability of 85% they will continue to sixth form if they get the grades in year 11, which are necessary to stay in full-time education. On average, students believe that if they go to sixth form, the likelihood of them getting the grades in sixth form to go to university is 75%. Finally, students believe that with a probability of 73% they will go to university if they get the grades in sixth form which allow them to go to university.¹⁶ As can be seen in columns 2-5, there are substantial

¹⁴We use the FRS 2013-2014 to obtain the statistics for a representative sample of households in the UK. We restrict the sample to households with at least one child aged 12-15. The average annual household income in this sample is £37,668. 32% of the parents in the representative sample are single parents, and in 38% of the households there is at least one parent who holds a university degree.

¹⁵Note that while in the survey students were asked to indicate their response to all probability questions on a 0-100 scale, we normalize the variables to have a 0-1 scale for the purpose of the analysis.

¹⁶We can also calculate the unconditional probability of ending in a specific terminal node. When we calculate these unconditional probabilities for each respondent and average across respondents we find that the average unconditional

gender and socio-economic differences in responses. Female students as well as students with better educated parents state higher likelihoods of obtaining the grades for sixth form, continuing to sixth form (conditional on getting the grades), getting the grades for university, and continuing to university (conditional on getting the grades).¹⁷

When we examine students' beliefs about the potential outcomes of each terminal state, we find that on average students perceive the probability of getting a job at age 25 to be (i) 51% if they leave full-time education after year 11, (ii) 66% if they go to sixth form but not to university, and (iii) 76% if they go to both sixth form and university. Conditional on having a job, students expect their earnings at age 25 to be (i) £20,292 if they leave full-time education after year 11, (ii) £21,568 if they go to sixth form but not to university, and (iii) £28,562 if they go to both sixth form and university.¹⁸ Using students' responses to these questions, we can calculate the perceived return to sixth form and the perceived return to university for each individual as described in the previous section.¹⁹ Again we document gender and socio-economic differences in responses (columns 2-5), which result in differences in perceived returns. We investigate those differences in more detail in the following section.

Table 2 also shows students' responses to the two questions which ask students how likely they think it is they would enjoy going to sixth form and how likely they think it is they would enjoy going to university, which provides us with information on the perceived consumption values of further education. We find that the average response to the first question is 77%, while the average response to the second question is 73%. We document a substantial degree of heterogeneity in responses. The standard deviations of the perceived consumption values are 0.20 and 0.22, respectively.²⁰ We note

probability of leaving education after year 11 is 30%, the average unconditional probability of going to sixth form but not to university is 24% and the average unconditional probability of going to university is 46%. In the UK, about 82% of students aged 16-18 years are enrolled in full-time education, while 48% of a given cohort of students continues to higher education (Department for Education 2016, 2017).

¹⁷For the matched subsample we document a strong and positive correlation between students' beliefs about the likelihood that they will obtain the grades in sixth form to go to university and students' actual performance on standardized tests taken in year 6 (corr=0.51). Moreover, we use data from the British Household Panel Study (BHPS) and the UK Longitudinal Household Study (UKLHS) to document that stated likelihoods of further educational attainment do correlate positively and significantly with actual decisions. Figure A.1 in Appendix A shows the percentage of students who attended university given the stated likelihood of university attendance with 95% confidence intervals. Students' beliefs about future educational attainment are significantly associated with actual choices.

¹⁸Using data from the Labour Force Survey we document that the average earnings of 25-year-old individuals in the UK are £17,500 for individuals who left school at 16, £18,500 for individuals who left school at 18, and £23,000 for individuals who went to university. The process of belief formation is complex and there may be many different reasons why students hold beliefs which are different than these population averages.

¹⁹To ensure that the results of our analysis are not driven by outliers, we remove the bottom and top 1% of expected earnings and the bottom and top 5% of perceived returns.

²⁰While we find some evidence of rounding, with 13% of subjects reporting a number which is a multiple of 10, we find that subjects make use of the entire 0 to 100 scale. Other studies using similar questions have reported similar levels of rounding (e.g. Zafar 2011). We additionally report that rounding practices do not significantly differ by gender, parental education or income. More specifically, we regress a dummy variable which equals 1 if the student reports a multiple of 10 on student characteristics and find that neither gender (p-value=0.546), nor parental education (p-value=0.317) or the income quartiles of the respondent (p-values=0.783,0.397,0.778) significantly predict whether students round.

that female students and students with better educated parents perceive both the likelihood of enjoying sixth form as well as the likelihood of enjoying university as higher.

Finally, Table 2 shows the average tuition costs (per year) as perceived by the students.²¹ On average, students believe that they will pay £7,302 per year if they choose to go to university with £9,000 being the modal value. Students with better educated parents expect to be paying somewhat more than students from less educated backgrounds. Figure A.3 in the Appendix shows the distribution of responses by gender and socio-economic groups. The patterns are similar for all subgroups with responses bunching at £5,000-£6,000 and £9,000-£10,000 and very few respondents expecting fees higher than £10,000. The survey was carried out one year after the government allowed universities to charge higher tuition fees of £6,000 with an upper tier of £9,000 if universities ensured access for poorer students. Most universities chose to charge the maximum tuition fees of £9,000.

²¹To ensure that results are not driven by outliers we set the top 1% of responses to missing.

Table 2: Average Beliefs in Sample

	All	Gender		Parent		Response
		Male	Female	No degree	Degree	Rate
<u>A: Perceived Conditional Probabilities</u>						
Get grades for sixth form	0.78 [0.19]	0.76 [0.20]	0.81 [0.17]	0.76 [0.21]	0.82 [0.16]	99.9%
Go to sixth form	0.85 [0.21]	0.83 [0.23]	0.88 [0.18]	0.82 [0.23]	0.88 [0.17]	99.9%
Get grades for university	0.75 [0.20]	0.74 [0.20]	0.77 [0.19]	0.72 [0.21]	0.79 [0.17]	99.6%
Go to university	0.73 [0.27]	0.70 [0.28]	0.77 [0.26]	0.67 [0.30]	0.81 [0.22]	99.3%
<u>B: Perceived Probability of Employment</u>						
Year 11	0.51 [0.30]	0.52 [0.30]	0.50 [0.31]	0.52 [0.30]	0.49 [0.30]	100%
Sixth form	0.66 [0.25]	0.65 [0.25]	0.67 [0.25]	0.88 [0.24]	0.64 [0.25]	100%
University	0.76 [0.23]	0.73 [0.25]	0.80 [0.21]	0.73 [0.26]	0.80 [0.20]	100%
<u>C: Perceived Earnings in £</u>						
Year 11	20,292 [21,571]	21,633 [22,040]	18,650 [20,893]	18,690 [19,740]	22,141 [23,396]	98.3%
Sixth form	21,568 [16,785]	22,667 [18,206]	20,223 [14,774]	20,348 [15,649]	22,993 [17,936]	99.2%
University	28,562 [23,265]	29,068 [26,421]	27,939 [18,675]	27,482 [22,204]	29,827 [24,417]	99.1%
<u>D: Perceived Consumption Value</u>						
Sixth form	0.77 [0.20]	0.75 [0.21]	0.80 [0.18]	0.75 [0.21]	0.80 [0.18]	99.7%
University	0.73 [0.22]	0.71 [0.24]	0.76 [0.20]	0.69 [0.24]	0.78 [0.20]	99.0%
<u>E: Perceived Tuition Costs</u>						
University	7,302 [5,025]	7,322 [5,203]	7,277 [4,808]	7,058 [4,940]	7,583 [5,113]	97.7%
Observations	885	486	399	480	405	

Note: This table reports the mean and standard deviation (in brackets) of student beliefs for all respondents as well as separately by gender and parental education. Panel A shows the average responses to the questions that elicit the four conditional probabilities. Panel B presents the average beliefs about the probability of getting a job at age 25 for each of the three possible terminal states, while Panel C presents the average beliefs about potential earnings (conditional on having a job) in each possible terminal state. Panel D presents the average perceived consumption value of sixth form and university. Panel E presents the average perceived tuition costs of university. The last column reports the response rates.

III Results

We begin our empirical investigation by documenting which student and household characteristics are predictive of the four different conditional probabilities we elicit (Table 3).²² First, we document which characteristics predict students' beliefs about whether they will get the grades at a given educational stage to proceed to the following educational stage (columns 1 and 3). Female students, more patient and more risk loving students perceive the probability of getting the grades to be significantly higher, both at the end of year 11 as well as at the end of sixth form.²³ The same is true for students who have at least one parent with a university degree. We also find evidence for an income gradient in individual responses. In particular, there seems to be a positive monotonic relationship between the household's income quartile and individual beliefs about the likelihood of obtaining the grades that are necessary to stay in full-time education, both at the end of year 11 as well as at the end of sixth form.

Next we investigate which characteristics predict students' beliefs about whether they would continue in full-time education if they got the grades (columns 2 and 4). We find sizeable gender and socio-economic gaps. Female students perceive the likelihood of going to sixth form (conditional on getting the grades in year 11) to be 5.9 percentage points higher and of going to university to be 7.4 percentage points higher. Students who have at least one parent with a university degree perceive the probability of going to sixth form to be 3.9 percentage points higher compared to children with less educated parents. Similarly, children with better educated parents perceive the probability of going to university to be 9.6 percentage points higher. Again we find evidence for an income gradient in individual responses. Compared to students in the bottom income quartile, students in the top income quartile perceive the probability of going to sixth form to be 8.7 percentage points higher, and they perceive the probability of going to university to be 10.8 percentage points higher.²⁴

²²Note that in all of the regressions, we control for region fixed effects, ethnicity fixed effects, gender, age, whether one of the parents has a university degree, whether the child is taken care of by a single parent, the number of children in the household, as well as quartile dummies for household income. For regressions with probabilities as a dependent variable we find no qualitative difference to the results when using a Tobit regression instead of OLS. The results are provided in Appendix A.

²³These results are consistent with results from other studies which find that the willingness to take risks as well as patience are positively correlated with cognitive ability/test scores (see Frederick 2005, Burks et al. 2009, Dohmen et al. 2010, Benjamin, Brown and Shapiro 2013, Alan et al. 2017, Falk et al. 2018).

²⁴Appendix Figure A.4 depicts the kernel densities of individual responses to the four different conditional probability questions, separately for male and female respondents. In all four panels the density for female respondents is shifted to the right of the density for male respondents, and the Kolmogorov-Smirnov test rejects the null of equality of distributions at the 1% level. Appendix Figure A.5 depicts the same four kernel densities, separately for respondents who do not have a parent with a university degree and students who have at least one parent with a university degree. Again we see a clear shift to the right, and the null of equality of distributions is rejected at the 1% level in all four cases.

Do individual beliefs about the benefits and costs of education predict students' intentions to continue in full-time education? We start by investigating whether this is the case for students' intentions to go to sixth form. Motivated by the theoretical framework presented in Section 1.1, we allow students' intentions to go to sixth form to be a function of the perceived benefits and costs of sixth form as well as university education. We estimate variants of the following reduced form specification:

$$y_i^{SF} = \alpha + \beta_1 X_i + \beta_2 PR_i^{SF} + \beta_3 PR_i^{uni} + \beta_4 CV_i^{SF} + \beta_5 CV_i^{uni} + \beta_6 TC_i^{uni} + \epsilon_i$$

where y_i^{SF} is the stated likelihood of going to sixth form, X_i is a vector of individual characteristics, PR_i^{SF} is the perceived return to sixth form, PR_i^{uni} is the perceived return to university, CV_i^{SF} and CV_i^{uni} are the perceived consumption values of sixth form and university, respectively, and TC_i^{uni} are the perceived tuition costs of university. The first column of Table 4 reproduces the results from the previous table. Column 2 additionally controls for the perceived returns to sixth form and to university. Both the perceived return to sixth form as well as the perceived return to university significantly predict students' beliefs about how likely it is that they would go to sixth form. This suggests that when students make their educational decisions at the end of year 11 they take the dynamic nature of the decision into account. In column 3 we control for both, the students' perceived consumption value of sixth form and of university, again finding that both estimated coefficients are positive and highly significant. While controlling for the perceived returns to education does not increase the R^2 of the regression very much (from 0.13 to 0.18), controlling for individual perceptions of how enjoyable further education is increases the R^2 substantially from 0.13 to 0.48.²⁵

²⁵While we cannot fully rule out that students might declare a higher likelihood of enjoying education if they perceive the pecuniary returns to education to be higher, we note that the correlations between the perceived consumption values of education and the perceived pecuniary returns to education are low (0.07 for sixth form and 0.15 for university). Moreover, if individual differences in the perceived consumption values merely reflected individual differences in perceived pecuniary returns, we would not expect the explanatory power of the regressions to increase by a significant amount when we add the perceived consumption values as additional control variables.

Table 3: Predictors of Perceived Conditional Probabilities (0-1)

	Sixth Form		University	
	Grades for sixth form	Go to sixth form	Grades for university	Go to university
	(1)	(2)	(3)	(4)
Female child	0.054*** (0.01)	0.059*** (0.01)	0.042*** (0.01)	0.074*** (0.02)
Age of child	0.009 (0.01)	0.011 (0.01)	0.011 (0.01)	0.020 (0.02)
Patience	0.017*** (0.00)	0.016*** (0.00)	0.016*** (0.00)	0.020*** (0.00)
Risk	0.008*** (0.00)	0.001 (0.00)	0.014*** (0.00)	0.014*** (0.00)
University (parent)	0.038*** (0.01)	0.039** (0.02)	0.045*** (0.01)	0.096*** (0.02)
Single parent	0.048*** (0.02)	0.028 (0.02)	0.008 (0.02)	0.016 (0.02)
Children in HH	-0.007 (0.00)	-0.007 (0.00)	-0.011** (0.00)	-0.010 (0.01)
2nd income quartile	0.040** (0.02)	0.035* (0.02)	0.037** (0.02)	0.034 (0.02)
3rd income quartile	0.065*** (0.02)	0.044** (0.02)	0.045** (0.02)	0.048* (0.02)
4th income quartile	0.089*** (0.02)	0.087*** (0.02)	0.064*** (0.02)	0.108*** (0.03)
Region and ethnicity FEs	Yes	Yes	Yes	Yes
R-Squared	0.17	0.13	0.16	0.18
Sample Mean	0.78	0.85	0.75	0.73
N	874	874	871	869

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The results are obtained using least squares regressions. The dependent variables are the perceived probabilities of obtaining the grades for sixth form, going to sixth form, obtaining the grades for university and going to university. Controls include a constant, and region and ethnicity fixed effects. *University (parent)* takes the value one if at least one parent has a university degree and zero otherwise.

Table 4: Predictors of Perceived Probability of Going to Sixth Form (0-1) I

Dependent variable: Conditional Probability of Going to Sixth Form					
	(1)	(2)	(3)	(4)	(5)
Female child	0.059*** (0.01)	0.044*** (0.01)	0.019* (0.01)	0.015 (0.01)	0.014 (0.01)
Age of child	0.011 (0.01)	0.013 (0.01)	0.004 (0.01)	0.011 (0.01)	0.008 (0.01)
Patience	0.016*** (0.00)	0.015*** (0.00)	0.000 (0.00)	0.001 (0.00)	0.002 (0.00)
Risk	0.001 (0.00)	0.005 (0.00)	-0.004 (0.00)	-0.001 (0.00)	-0.000 (0.00)
University (parent)	0.039** (0.02)	0.024 (0.02)	0.013 (0.01)	0.013 (0.01)	0.009 (0.01)
Single parent	0.028 (0.02)	0.012 (0.02)	0.015 (0.01)	0.004 (0.01)	0.004 (0.01)
Children in household	-0.007 (0.00)	-0.008 (0.01)	0.004 (0.00)	0.001 (0.00)	0.000 (0.00)
2nd income quartile	0.035* (0.02)	0.028 (0.02)	0.014 (0.01)	0.014 (0.02)	0.015 (0.02)
3rd income quartile	0.044** (0.02)	0.059*** (0.02)	0.027* (0.01)	0.048*** (0.02)	0.048*** (0.02)
4th income quartile	0.087*** (0.02)	0.073*** (0.02)	0.044*** (0.02)	0.044** (0.02)	0.044** (0.02)
Perceived return (sixth form)		0.011*** (0.00)		0.009*** (0.00)	0.009*** (0.00)
Perceived return (university)		0.033*** (0.01)		0.019*** (0.01)	0.020*** (0.01)
Consumption value (sixth form)			0.583*** (0.03)	0.529*** (0.04)	0.516*** (0.04)
Consumption value (university)			0.122*** (0.03)	0.102*** (0.04)	0.101*** (0.04)
Perceived tuition in '000s (university)					0.002* (0.00)
Region and ethnicity FEs	Yes	Yes	Yes	Yes	Yes
R-Squared	0.13	0.18	0.48	0.47	0.47
Sample Mean	0.85	0.85	0.85	0.85	0.85
N	874	692	867	689	683

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The results are obtained using least squares regressions. The dependent variable is the perceived probability of going to sixth form (conditional on getting the grades). Controls include a constant, and region and ethnicity fixed effects. *University (parent)* takes the value one if at least one parent has a university degree and zero otherwise.

When we control for both the perceived returns and the perceived consumption values in column 4, both the perceived returns as well as the perceived consumption values significantly predict how likely students think it is that they would go to sixth form if they got the grades. An increase in the perceived return to sixth form by 10 percentage points is associated with an increase of 0.09 percentage points, while an increase in the perceived return to university by 10 percentage points is associated with an increase of 0.19 percentage points. Moreover, a student who perceives the likelihood of sixth form being enjoyable to be 10 percentage points higher reports being 5.3 percentage points more likely to go to sixth form, while a student who perceives the likelihood of university being enjoyable to be 10 percentage points higher reports being 1.0 percentage points more likely to go to sixth form.²⁶ The magnitude of the latter effect sizes is large, indicating that perceived consumption values are likely to play a major role in educational investment decisions.²⁷

In column 5 we additionally control for students' perceptions about the tuition costs of university. The point estimate of the coefficient on perceived tuition costs is close to zero, and controlling for perceived tuition costs does not increase the R^2 of the regression, indicating that perceptions about the costs of university do not seem to play a major role in students' decisions to continue to sixth form.

Next we investigate whether individual beliefs about the benefits and costs of university education predict students' intentions to go to university. For this purpose, we estimate variants of the following reduced form specification, where y_i^{uni} is the perceived likelihood of attending university:

$$y_i^{uni} = \alpha + \beta_1 X_i + \beta_2 PR_i^{uni} + \beta_3 CV_i^{uni} + \beta_4 TC_i^{uni} + \epsilon_i$$

The results are presented in Table 5. Column 1 reproduces the results in Table 3. Column 2 controls for the perceived return to university, while column 3 controls for the perceived consumption value of university. Column 4 includes both of these controls into the same regression. Focusing on the results in column 4 we find that both the perceived return as well as the perceived consumption value significantly predict responses. In particular, an increase in the perceived return to university by 10 percentage points is associated with an increase in the perceived probability of going to university of 0.2 percentage points. Moreover, a student who reports a 10 percentage point higher likelihood

²⁶As presented in Table 2, the standard deviation of the likelihood of sixth form and university being enjoyable are 0.2 and 0.22, respectively.

²⁷We further investigate whether there are significant interaction effects between the perceived returns and the perceived consumption values. When we include interaction terms into the analysis presented in Table 4, neither the coefficient on the interaction term *perceived return SF* \times *consumption value SF* ($\beta=-0.02$, p-value=0.253) nor the coefficient on the interaction term *perceived return uni* \times *consumption value uni* ($\beta=-0.03$, p-value=0.281) is significant.

of enjoying university, reports being 8.2 percentage points more likely to go to university.²⁸ Again we note that while controlling for the perceived return only leads to a modest increase in the R^2 of the regression (from 0.18 to 0.20), controlling for the perceived consumption value increases the R^2 substantially from 0.18 to 0.54.²⁹ Finally, in column 5 we also control for the perceived tuition costs of university. Surprisingly, we do not find that students' beliefs about the tuition costs of university play any role in students' decisions to go to university. The coefficient estimate is close to zero and insignificant, and controlling for perceptions about costs does not increase the R^2 of the regression.³⁰

When investigating the results presented in Tables 4 and 5 more closely, it becomes apparent that differences in beliefs can account for a substantial share of the gender and socio-economic gaps in students' intentions to pursue further education. We find particularly large differences in the estimated coefficients on gender and socio-economic background variables when we control for the perceived consumption values. In particular, when controlling for the perceived consumption values in Table 4 in column 3, the estimated coefficient on whether the respondent is female is 1.9 percentage points which is significantly smaller than the coefficient estimated in column 1 (at the 1% level). Similarly, the estimated coefficient on whether one of the parents holds a university degree is now close to zero and no longer statistically significant, and the estimated coefficient is significantly different from the estimated coefficient in column 1 (at the 1% level). The estimated income gradient is also significantly less steep. Compared to students in the bottom income quartile, students in the top income quartile now perceive the likelihood of going to university to only be 4.4 percentage points higher (compared to 8.7 percentage points in column 1). Again the null hypothesis that the two estimated coefficients in columns 1 and 3 are equal is rejected at the 1% level.

Turning to the estimates in Table 5, which investigates which factors predict students' intentions to go to university, we find similar patterns. When controlling for the perceived consumption value in Table 5 in column 3, the coefficient on gender is no longer statistically different from zero, and it is

²⁸According to a back-of-the-envelope calculation, a one percentage increase in the likelihood of enjoying university increases the likelihood of going to university to the same extent as a £5,800 increase in the perceived monetary return (i.e. a 41% increase in average expected earnings compared to not going to university, which is £14,153). While this number seems very large, it should be noted that this can be attributed to the fact that intentions are not very responsive to monetary returns and this flat slope mechanically inflates any comparison of this type.

²⁹We note that we do not find any evidence for significant interaction effects between perceived returns and the perceived consumption value. When we include an interaction term *perceived return uni* \times *consumption value uni* the coefficient on the interaction term is close to zero and insignificant ($\beta=0.00$, $p\text{-value}=0.944$). Moreover, our results are robust to the exclusion of individuals who stated a low probability of going to sixth form and therefore have a low probability of reaching this decision node (see Appendix Table A.2).

³⁰We note that the results in Tables 4 and 5 are robust to controlling for students' beliefs about the likelihood of obtaining the grades to pursue further education. We also show that we obtain qualitatively similar results when we use binary variables which equal one if students perceive the pecuniary returns to sixth form and university to be strictly positive instead of the continuous measures of perceived returns (see Tables A.6 and A.7).

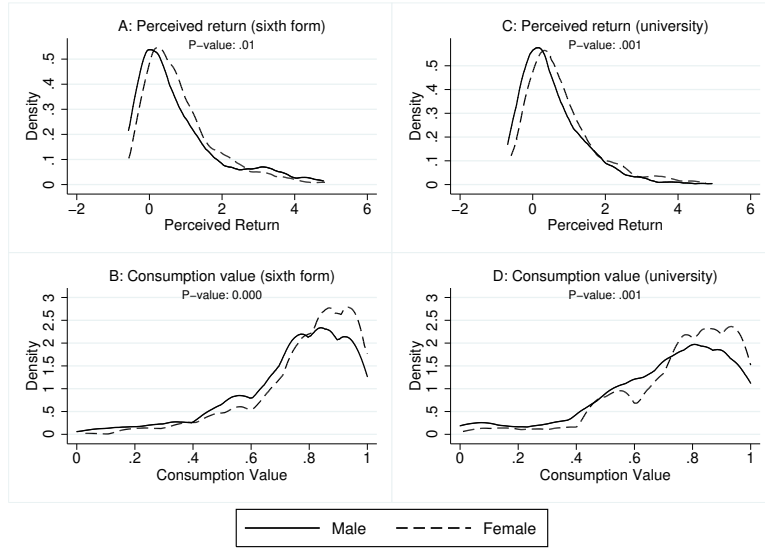
statistically different from the coefficient estimated in column 1 at the 1% level. We also find that the coefficient on whether one of the parents holds a university degree is significantly reduced. While the coefficient on parental education is still highly significant in column 3, the point estimate is reduced by approximately half and the difference in coefficients between columns 1 and 3 is statistically significant at the 1% level. The point estimate on the top income quartile is reduced to zero and is no longer significant. Again the difference in coefficients between columns 1 and 3 is statistically significant at the 1% level.

Consistent with these findings, we find that gender as well as the socio-economic background characteristics of the respondent significantly predict the perceived consumption value of further education (see columns 3 and 4 of Table 6). The estimated gender difference in the perceived consumption value is large. Female students report the likelihood of enjoying sixth form to be 5.0 percentage points higher and the likelihood of enjoying university to be 6.4 percentage points higher. We also find large differences across socio-economic groups. Students who have at least one parent with a university degree report the likelihood of enjoying sixth form and university to be 3.0 and 5.8 percentage points higher, respectively. Compared to students in the bottom income quartile, students in the top income quartile report the likelihood of enjoying sixth form and university to be 5.6 and 10.6 percentage points higher.

Controlling for differences in the perceived returns to education also reduces some of the estimated coefficients on gender and the socio-economic background variables in Tables 4 and 5. This is also consistent with the results in Table 6 (columns 1 and 2). Female respondents perceive the returns to university to be 25.3 percentage points higher. Parental education and income is also positively associated with the perceived returns to university. Students who have at least one parent with a university degree perceive the returns to university to be 14.8 percentage points higher, while students whose parents are in the top income quartile perceive the returns to be 18.7 percentage points higher. We visualize these differences in Figures 3 and 4 which depict the kernel densities of perceived returns (Panels A and C) and perceived consumption values (Panels B and D), by gender and by parental education, respectively.

Given the sizeable gender and socio-economic gaps in beliefs, another question which emerges is whether beliefs about the benefits and costs of education play a larger role for some groups compared to others. For this purpose, we re-estimate the specifications in column 5 of Table 4 and column 5 of Table 5 separately for male and female respondents as well as separately for students who do not have a parent with a university degree and students who do have a parent with a university degree.

Figure 3: Perceived Returns and Consumption Values by Gender

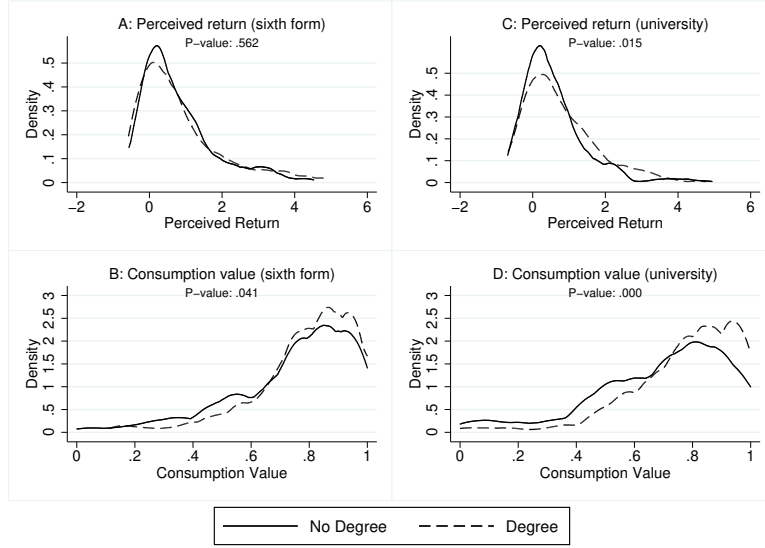


Note: The different panels depict the kernel densities of individual beliefs about the returns to sixth form (Panel A), the consumption value of sixth form (Panel B), the returns to university (Panel C), and the consumption value of university (Panel D). The densities are depicted for male and female students, respectively. Reported p-values are from Kolmogorov-Smirnov tests of equality of distributions.

Table 7 presents the results for students' intentions to go to sixth form, while Table 8 presents the results for students' intentions to go to university. We do not find any significant differences in the estimated coefficients across the different genders, both in students' decisions to go to sixth form as well as university. We do, however, find significant differences by parental education. Students with lower educated parents place a significantly larger weight on the perceived consumption value of further education in their decision to go to university (p-value=0.059). Taken together, students from less educated backgrounds not only perceive the likelihood of enjoying further education to be lower, but the perceived consumption value also plays a larger role in their decision of whether to continue in further education.

Having established that students' beliefs about the benefits of further education play an important role in students' decisions to obtain further education (conditional on getting the grades), we now investigate whether these beliefs are also predictive of students' perceptions about how likely it is that they will obtain the required grades to pursue further education. Given that students have control over how much effort to exert in school, it may very well be that students' perceptions about the benefits and costs of further education predict the perceived likelihood of obtaining the necessary grades. The results are presented in Table 9. We find that students' beliefs about the consumption value of sixth

Figure 4: Perceived Returns and Consumption Values by Parental Education



Note: The different panels depict the kernel densities of individual beliefs about the returns to sixth form (Panel A), the consumption value of sixth form (Panel B), the returns to university (Panel C), and the consumption value of university (Panel D). The densities are depicted for students who do not have a parent with a university degree and for students who do have a parent with a university degree. Reported p-values are from Kolmogorov-Smirnov tests of equality of distributions.

form as well as the consumption value of university significantly predict students' beliefs about the likelihood of getting the grades for sixth form. Similarly, students' beliefs about the consumption value of university significantly predict students' beliefs about the likelihood of getting the grades for university. Interestingly, we do not find that students' perceptions about the monetary returns to sixth form or university are significant predictors of the perceived likelihood of getting the required grades. The results are consistent with students exerting more effort in school to achieve higher grades if they believe that by getting the grades they can pursue further education which they think they are likely to enjoy. We also note that controlling for the perceived consumption value significantly reduces the estimated gender and socio-economic gaps in perceptions about the likelihood of obtaining the grades. For example, once we control for the perceived consumption value of university, there is no longer a gender or socio-economic gap in students' perceptions of obtaining the required grades for university.

Table 5: Predictors of Perceived Probability of Going to University (0-1) I

Dependent variable: Conditional Probability of Going to University					
	(1)	(2)	(3)	(4)	(5)
Female child	0.074*** (0.02)	0.055*** (0.02)	0.021 (0.01)	0.012 (0.01)	0.013 (0.01)
Age of child	0.020 (0.02)	0.016 (0.02)	0.007 (0.01)	0.002 (0.01)	0.002 (0.01)
Patience	0.020*** (0.00)	0.018*** (0.00)	0.004 (0.00)	0.002 (0.00)	0.002 (0.00)
Risk	0.014*** (0.00)	0.017*** (0.00)	0.001 (0.00)	0.001 (0.00)	0.001 (0.00)
University (parent)	0.096*** (0.02)	0.093*** (0.02)	0.051*** (0.01)	0.048*** (0.02)	0.049*** (0.02)
Single parent	0.016 (0.02)	-0.003 (0.02)	-0.021 (0.02)	-0.024 (0.02)	-0.023 (0.02)
Children in HH	-0.010 (0.01)	-0.009 (0.01)	-0.006 (0.00)	-0.004 (0.01)	-0.002 (0.01)
2nd income quartile	0.034 (0.02)	-0.000 (0.03)	0.001 (0.02)	-0.014 (0.02)	-0.014 (0.02)
3rd income quartile	0.048* (0.02)	0.027 (0.03)	0.016 (0.02)	0.004 (0.02)	0.003 (0.02)
4th income quartile	0.108*** (0.03)	0.062** (0.03)	0.021 (0.02)	-0.002 (0.02)	-0.001 (0.02)
Perceived return (university)		0.043*** (0.01)		0.021*** (0.01)	0.020** (0.01)
Consumption value (university)			0.811*** (0.03)	0.820*** (0.03)	0.824*** (0.04)
Perceived tuition in '000s (university)					-0.001 (0.00)
Region and ethnicity FEs	Yes	Yes	Yes	Yes	Yes
R-Squared	0.18	0.20	0.54	0.55	0.55
Sample Mean	0.73	0.73	0.73	0.73	0.73
N	869	753	864	750	742

Notes: Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01. The results are obtained using least squares regressions. The dependent variable is the perceived probability of going to university (conditional on getting the grades). Controls include a constant, and region and ethnicity fixed effects. *University (parent)* takes the value one if at least one parent has a university degree and zero otherwise.

Table 6: Predictors of Perceived Returns and Consumption Values

	Perceived Return		Consumption Value	
	Sixth form	University	Sixth form	University
	(1)	(2)	(3)	(4)
Female child	0.073 (0.16)	0.253*** (0.07)	0.050*** (0.01)	0.064*** (0.01)
Age of child	0.274* (0.15)	0.119* (0.06)	0.015 (0.01)	0.015 (0.01)
Patience	-0.068* (0.04)	-0.035** (0.02)	0.020*** (0.00)	0.019*** (0.00)
Risk	0.061 (0.04)	0.008 (0.02)	0.006* (0.00)	0.016*** (0.00)
University (parent)	0.102 (0.18)	0.148* (0.08)	0.030** (0.01)	0.058*** (0.02)
Single parent	0.265 (0.21)	0.163* (0.09)	0.012 (0.02)	0.042** (0.02)
Children in HH	0.038 (0.06)	0.036 (0.03)	-0.013*** (0.00)	-0.006 (0.01)
2nd income quartile	0.134 (0.23)	-0.028 (0.10)	0.038** (0.02)	0.047** (0.02)
3rd income quartile	0.007 (0.23)	0.101 (0.10)	0.026 (0.02)	0.041** (0.02)
4th income quartile	0.032 (0.25)	0.187* (0.11)	0.056*** (0.02)	0.106*** (0.02)
Region and ethnicity FEs	Yes	Yes	Yes	Yes
R-Squared	0.04	0.09	0.13	0.19
Sample Mean	1.29	0.65	0.77	0.73
N	741	758	872	867

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The results are obtained using least squares regressions. The dependent variables are the perceived returns to sixth form (column (1)), the perceived returns to university (column (2)), the perceived consumption value of sixth form (column (3)) and the perceived consumption value of university (column (4)). Controls include a constant, and region and ethnicity fixed effects. *University (parent)* takes the value one if at least one parent has a university degree and zero otherwise.

Table 7: Predictors of Perceived Probability of Going to Sixth Form (0-1) II

	Gender			Parent		
	(1) Male	(2) Female	(3) p-value	(4) No Degree	(5) Degree	(6) p-value
Female child				-0.002 (0.02)	0.034** (0.02)	0.092
Age of child	0.008 (0.01)	0.014 (0.02)	0.774	0.024 (0.02)	0.001 (0.01)	0.281
Patience	0.003 (0.00)	0.003 (0.00)	0.930	0.006 (0.00)	-0.001 (0.00)	0.117
Risk	0.002 (0.00)	-0.001 (0.00)	0.655	0.007 (0.00)	-0.009** (0.00)	0.003
University (parent)	-0.021 (0.02)	0.041** (0.02)	0.010			
Single parent	0.010 (0.02)	-0.007 (0.02)	0.583	0.015 (0.02)	-0.009 (0.02)	0.475
Children in HH	0.002 (0.01)	-0.006 (0.01)	0.322	0.004 (0.01)	-0.002 (0.01)	0.433
2nd income quartile	0.021 (0.02)	0.008 (0.02)	0.697	0.014 (0.02)	0.033 (0.03)	0.562
3rd income quartile	0.055** (0.02)	0.032 (0.02)	0.496	0.060*** (0.02)	0.033 (0.02)	0.447
4th income quartile	0.062** (0.03)	0.019 (0.03)	0.191	0.065** (0.03)	0.035 (0.02)	0.418
Perceived return (sixth form)	0.011** (0.00)	0.004 (0.00)	0.138	0.011** (0.00)	0.008* (0.00)	0.636
Perceived return (university)	0.023** (0.01)	0.024** (0.01)	0.925	0.026** (0.01)	0.015 (0.01)	0.740
Consumption value (sixth form)	0.513*** (0.06)	0.483*** (0.06)	0.765	0.578*** (0.06)	0.420*** (0.05)	0.104
Consumption value (university)	0.133*** (0.05)	0.025 (0.05)	0.211	0.046 (0.05)	0.147*** (0.05)	0.198
Perceived tuition in '000s (university)	0.003* (0.00)	0.001 (0.00)	0.333	0.002 (0.00)	0.002 (0.00)	0.657
Region and ethnicity FEs	Yes	Yes		Yes	Yes	
R-Squared	0.50	0.45		0.51	0.47	
Sample Mean	0.85	0.85		0.85	0.85	
N	366	317		361	322	

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The results are obtained using least squares regressions. The dependent variable is the perceived probability of going to sixth form (conditional on getting the grades). Column (1) provides the estimates for male students while column (2) provides the estimates for female students. Column (3) provides the p-values to a test which tests whether the estimates in columns (1) and (2) are the same. Column (4) provides estimates for students who do not have a parent with a university degree while column (5) provides estimates for students who do have a parent with a university degree. Column (6) provides the p-values to a test which tests whether the estimates in columns (4) and (5) are the same. Controls include a constant, and region and ethnicity fixed effects. *University (parent)* takes the value one if at least one parent has a university degree and zero otherwise.

Table 8: Predictors of Perceived Probability of Going to University (0-1) II

	Gender			Parent		
	(1) Male	(2) Female	(3) p-value	(4) No Degree	(5) Degree	(6) p-value
Female child				0.011 (0.02)	0.022 (0.02)	0.666
Age of child	-0.005 (0.02)	0.018 (0.02)	0.319	0.007 (0.02)	0.000 (0.02)	0.802
Patience	-0.003 (0.00)	0.004 (0.00)	0.258	-0.001 (0.01)	0.003 (0.00)	0.498
Risk	0.004 (0.01)	-0.003 (0.01)	0.336	0.003 (0.01)	-0.003 (0.00)	0.323
University (parent)	0.038* (0.02)	0.066*** (0.02)	0.347			
Single parent	-0.006 (0.02)	-0.046* (0.02)	0.295	-0.012 (0.03)	-0.034 (0.02)	0.557
Children in HH	-0.001 (0.01)	-0.004 (0.01)	0.840	-0.008 (0.01)	0.007 (0.01)	0.135
2nd income quartile	0.020 (0.03)	-0.044 (0.03)	0.110	-0.015 (0.03)	-0.005 (0.03)	0.812
3rd income quartile	0.013 (0.03)	-0.018 (0.03)	0.382	0.014 (0.03)	-0.002 (0.03)	0.677
4th income quartile	0.019 (0.03)	-0.023 (0.03)	0.289	-0.045 (0.04)	0.019 (0.03)	0.152
Perceived return (university)	0.016 (0.01)	0.019* (0.01)	0.871	0.028** (0.01)	0.010 (0.01)	0.245
Consumption value (university)	0.837*** (0.05)	0.800*** (0.06)	0.612	0.870*** (0.05)	0.724*** (0.05)	0.059
Perceived tuition in '000s (university)	-0.001 (0.00)	-0.000 (0.00)	0.721	-0.003 (0.00)	-0.000 (0.00)	0.392
Region and ethnicity FEs	Yes	Yes		Yes	Yes	
R-Squared	0.57	0.51		0.54	0.51	
Sample Mean	0.73	0.73		0.73	0.73	
N	401	341		395	347	

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The columns report the marginal effects from least squares regressions in which the dependent variable is the perceived probability of going to university conditional on getting the grades. Column (1) provides the estimates for male students while column (2) provides the estimates for female students. Column (3) provides the p-values to a test which tests whether the estimates in columns (1) and (2) are the same. Column (4) provides estimates for students who do not have a parent with a university degree while column (5) provides estimates for students who do have a parent with a university degree. Column (6) provides the p-values to a test which tests whether the estimates in columns (4) and (5) are the same. Controls include a constant, and region and ethnicity fixed effects. *University (parent)* takes the value one if at least one parent has a university degree and zero otherwise.

Table 9: Perceived Probability of Getting Grades for Sixth Form and University (0-1)

	Sixth form			University		
	(1)	(2)	(3)	(4)	(5)	(6)
Female child	0.054*** (0.01)	0.020* (0.01)	0.021* (0.01)	0.042*** (0.01)	-0.000 (0.01)	-0.001 (0.01)
Age of child	0.009 (0.01)	0.009 (0.01)	0.006 (0.01)	0.011 (0.01)	0.003 (0.01)	0.002 (0.01)
Patience	0.017*** (0.00)	0.005* (0.00)	0.006* (0.00)	0.016*** (0.00)	0.003 (0.00)	0.003 (0.00)
Risk	0.008*** (0.00)	0.002 (0.00)	0.002 (0.00)	0.014*** (0.00)	0.003 (0.00)	0.002 (0.00)
University (parent)	0.038*** (0.01)	0.008 (0.01)	0.006 (0.01)	0.045*** (0.01)	0.016 (0.01)	0.014 (0.01)
Single parent	0.048*** (0.02)	0.035** (0.01)	0.035** (0.02)	0.008 (0.02)	-0.009 (0.01)	-0.009 (0.01)
Children in HH	-0.007 (0.00)	-0.001 (0.00)	-0.001 (0.00)	-0.011** (0.00)	-0.008** (0.00)	-0.008** (0.00)
2nd income quartile	0.040** (0.02)	0.023 (0.02)	0.024 (0.02)	0.037** (0.02)	0.008 (0.01)	0.009 (0.02)
3rd income quartile	0.065*** (0.02)	0.050*** (0.02)	0.050*** (0.02)	0.045** (0.02)	0.014 (0.02)	0.013 (0.02)
4th income quartile	0.089*** (0.02)	0.056*** (0.02)	0.057*** (0.02)	0.064*** (0.02)	-0.005 (0.02)	-0.006 (0.02)
Perceived return (sixth form)		0.004 (0.00)	0.004 (0.00)			
Perceived return (university)		0.003 (0.01)	0.004 (0.01)		0.003 (0.01)	0.002 (0.01)
Consumption value (sixth form)		0.344*** (0.04)	0.336*** (0.04)			
Consumption value (university)		0.206*** (0.04)	0.204*** (0.04)		0.564*** (0.03)	0.563*** (0.03)
Perceived tuition in '000s (university)			0.002* (0.00)			0.003*** (0.00)
Region and ethnicity FEs	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.17	0.38	0.38	0.16	0.47	0.48
Sample Mean	0.78	0.78	0.78	0.75	0.75	0.75
N	874	689	683	871	753	745

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The columns report the marginal effects from least squares regressions in which the dependent variable is the perceived probability of getting the grades to go to sixth form (columns 1-3) and university, conditional on having completed sixth form (columns 4-6). Controls include a constant, and region and ethnicity fixed effects. *University (parent)* takes the value one if at least one parent has a university degree and zero otherwise.

IV Discussion

Given the strong associations we document, the results of our analysis suggest that individual perceptions of the consumption value of further education are likely to play a vital role in students' educational investment decisions. A natural question to ask is which aspects of the further education experience are particularly relevant to students when they make their educational choices. In our survey, we also ask them to report the three main reasons behind their decision. While 45% of all students state they would go to university 'to experience new things and places' and 23% say they would go to university because they would 'enjoy the social life', only 14% state that they 'enjoy education' as one of their primary three reasons.³¹ While this evidence is solely indicative, it does suggest that factors which go beyond the pleasure of knowledge acquisition are likely to be important in students' educational investment decisions.

The second main result which emerges from our analysis is that there are large differences in perceived consumption values across groups. Given the low levels of social mobility in the UK, a matter of particular concern are the large socio-economic gaps in students' perceived consumption values. The documented gaps raise the question *why* students from different socio-economic groups have different perceptions of whether they would enjoy further education.

One potential explanation may be that students from low socio-economic status households are not aware of the non-pecuniary benefits of further education. Beliefs and expectations are influenced by information. A possible explanation for differential access to information is the influence of parents, siblings, relatives, and other members of the social network, who in the case of high socio-economic status households are more likely to have been to, or know people who have been to sixth form and university.

Another potential explanation is that students do not only *perceive* the non-pecuniary benefits as different, but that the non-pecuniary benefits are actually different for students from different socio-economic groups. Disadvantaged students may receive less parental support both when they struggle financially, socially or academically, and they might be less likely to fit into the social environment.

They may be more likely to have to take up part-time employment to finance their studies and to

³¹An interesting avenue for future research would also be to investigate whether the reasons why individuals think they would enjoy university differ by individual background characteristics. We find suggestive evidence that this may be the case. Among students who have at least one parent with a university degree, 41% report that they would go to university 'to experience new things and places', 25% state they would go to university because they would 'enjoy the social life' and 15% state 'enjoy education' as one of their primary reasons. For students whose parents have not attended university, these numbers are 48%, 21% and 13%, respectively.

struggle with the work load. Using data from the Longitudinal Study of Young People in England (LSYPE), we find that 29% of university students from families with income less than £30,000 report being generally satisfied with their life, compared to 36% of university students whose families have an income which is higher than £30,000. Moreover, 31% of students from low income families report that working part-time while at university is interfering with their studies compared to only 26% from high income families.³² Interestingly, students were also asked whether they thought university was better than they had expected. Only 10% of students from low income families report that university was better than expected, compared to 20% of students from high income families. While this evidence is merely indicative, these figures do suggest that students from different socio-economic groups might really have a different experience whilst at university. Better data which contains detailed information on students' social and academic experiences as well as students' socio-economic background will be needed to obtain a full picture on how students' actual experiences differ.

To design policy interventions which can narrow the socio-economic gaps in educational attainment, it will be crucial to understand whether students from different socio-economic groups only perceive the non-pecuniary benefits of education as different or whether they do indeed experience being in full-time education differently. If disadvantaged students lack access to information, then informational interventions could be very effective in narrowing socio-economic gaps.³³ If instead students really differ in how they experience being in full-time education, then interventions which target the actual experience of disadvantaged students could be effective in attracting and retaining students from disadvantaged groups.

V Conclusion

In this study we use a unique survey of secondary school students in the UK to investigate students' motives for educational attainment. We find that both the perceived pecuniary returns to education as well as the perceived consumption value of education significantly predict students' stated likelihood to continue in full-time education conditional on getting the requisite grades. While differences in the perceived pecuniary returns can explain some of the variation in individual responses, we find that controlling for differences in the perceived consumption value of education explains a remarkably large

³²Walpole (2013) also documents that students from low socio-economic backgrounds are more likely to take up employment work to finance their studies and less likely to be involved in university activities.

³³Other informational interventions that convey information about the pecuniary returns to education (Jensen 2010) or provide information/assistance about financial aid have been found to be successful in the past (Bettinger et al. 2012; Hoxby and Turner 2013).

share of the variation. In fact, individual differences in the perceived consumption value alone can explain 43% and 51% of the variation in students' intentions to continue to sixth form and university, respectively. Our results also suggest that students consider the option value of sixth-form completion as we find that perceived returns to university positively impact their intentions to go to sixth form. Interestingly, we do not find that students' perceptions about tuition fees play any role in their decisions.

We further document large gender and socio-economic gaps in the perceived consumption value of further education. Female students as well as students with high socio-economic status perceive the consumption value to be significantly higher. Furthermore, we find that controlling for individual differences in the perceived consumption value significantly reduces both the gender gap as well as the socio-economic gap in students' intentions to continue in full-time education. For example, once we control for the perceived consumption value of university, we no longer find evidence for a gender gap or an income gradient in students' intentions to go to university. Given the sequential nature of the decision problem, perceptions about the consumption value of university also impact intentions to continue to sixth form. Gaps in the perceived consumption value of university therefore also contribute to the gaps in sixth-form enrollment. We also investigate whether the perceived consumption value of further education plays a larger role in the decision to continue in full-time education for some groups compared to others. While we find no significant differences by gender, we find that students with lower educated parents place a significantly larger weight on the perceived consumption value in their decision to go to university. Taken together, students from low socio-economic backgrounds not only perceive the consumption value of further education to be lower, but this perceived consumption value receives more weight in their educational attainment decision. Finally, we document that students' perceptions about the benefits and costs of further education predict their beliefs about their own performance, and that gender and socio-economic gaps in beliefs can account for a sizeable proportion of students' beliefs about the likelihood of obtaining the grades.

The results of this paper raise important policy-relevant questions. While traditional policies have focused on increasing university enrollment by alleviating credit constraints, the results from our descriptive analysis suggest that policy interventions which make the pecuniary and non-pecuniary benefits of further education more salient might have the potential of increasing enrollment in higher education, especially among low socio-economic status students. Causal evidence will be needed to understand whether such interventions can indeed encourage students who have the potential to succeed

in further education to apply. More research will be needed on whether students from different socio-economic groups only differ in their *perceptions* of the consumption value of further education or whether the non-pecuniary benefits that accrue really differ with students' socio-economic background, in which case improving students' actual experiences at university might be key.

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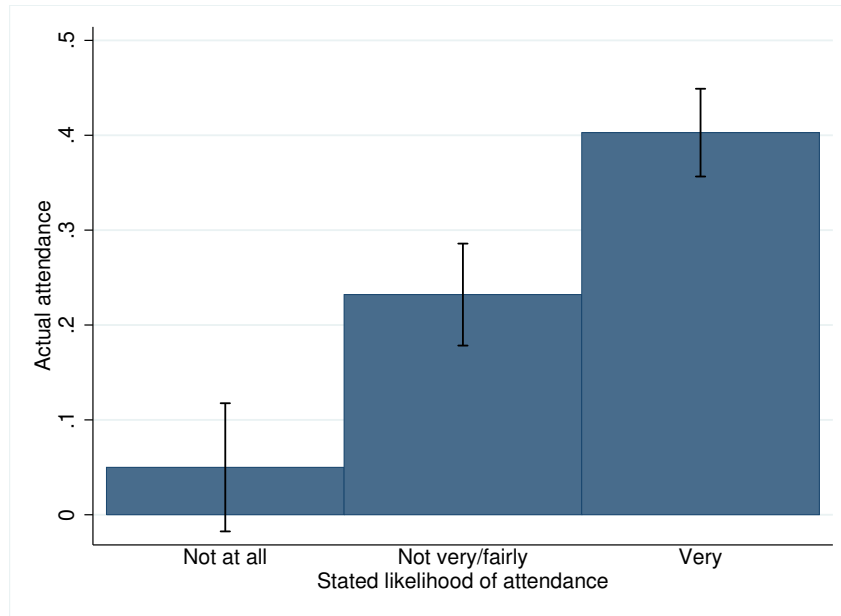
A Supplementary Analysis

Table A.1: Further Education Gap

	A levels		University		University (conditional on A levels)	
	(1)	(2)	(3)	(4)	(5)	(6)
University (parent)	0.201*** (0.01)	0.201*** (0.01)	0.138*** (0.02)	0.152*** (0.01)	0.050** (0.02)	0.060*** (0.02)
Female	0.088*** (0.01)	0.087*** (0.01)	0.091*** (0.01)	0.077*** (0.01)	0.063*** (0.02)	0.032* (0.02)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Cohort dummy	No	Yes	No	Yes	No	Yes
R-Squared	0.13	0.14	0.08	0.23	0.03	0.39
N	5015	5015	4501	4501	2444	2444

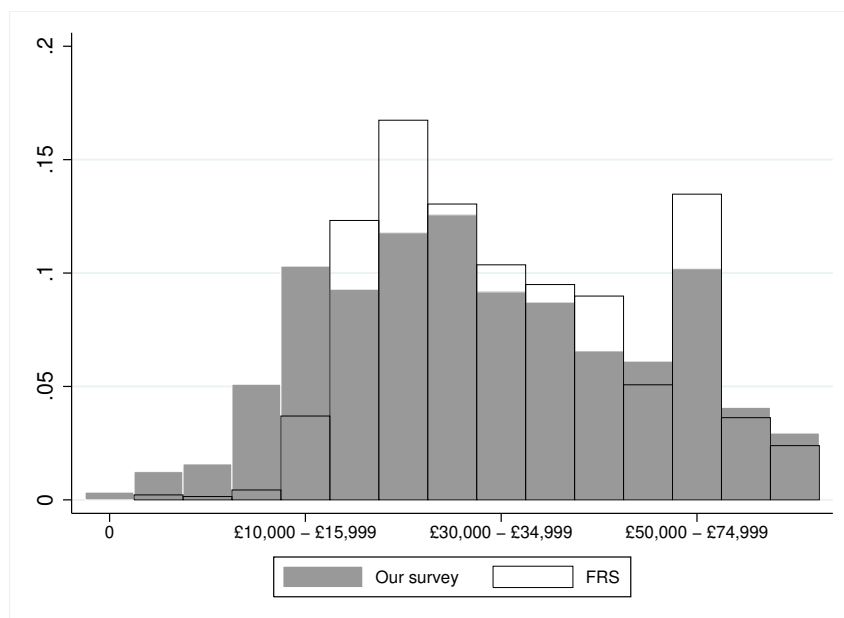
Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The sample includes all respondents born after 1980 that are surveyed at least once after the age of 18 residing in England. All regressions include a constant. University (parent) is a dummy taking the value one if at least one parent has a university degree. Controls include a constant, scores from each of the Big Five personality traits (openness, agreeableness, conscientiousness, extraversion, neuroticism) and from both cognitive and verbal tests. The Cohort dummy includes a dummy for each year of birth. In columns 5-6 the sample is restricted to only those individuals who attended sixth form.

Figure A.1: University Attendance and Stated Likelihood



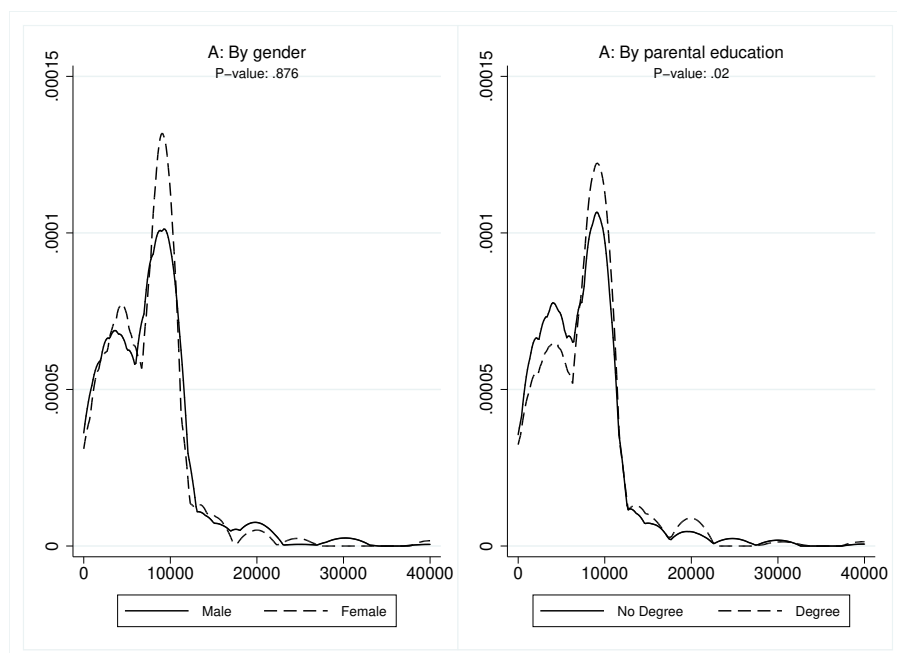
Data Source: British Household Panel Study (BHPS) and UK Longitudinal Household Study (UKLHS). Note: Likelihood of attendance is stated at least one year before the decision to go to university.

Figure A.2: Comparison of Household Income Distributions



Note: This figure shows the distribution of annual household income (after tax) for households in our sample and for a representative sample of households with at least one child aged 12-15 (Source: Family Resources Survey 2013-2014).

Figure A.3: Perceived University Tuition Fees



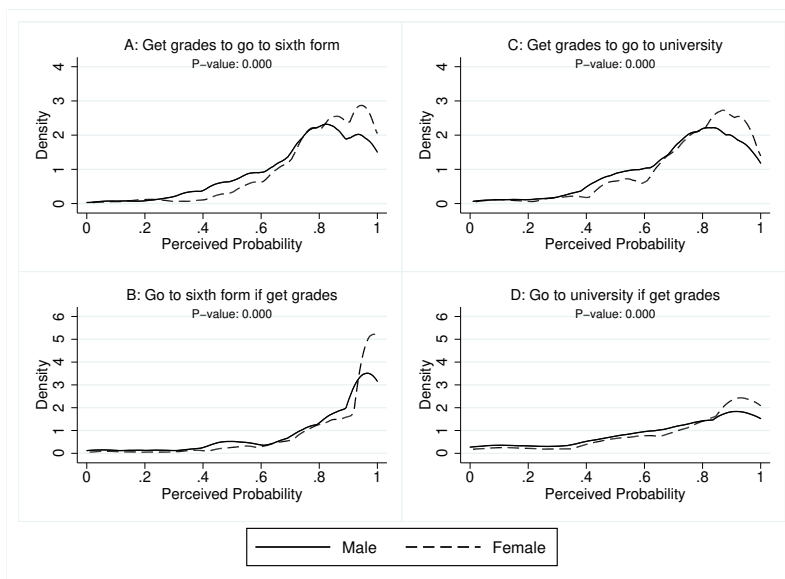
Note: Panels depict kernel densities of perceived university tuition fees separately for female/male students (Panel A) and students whose parents have/do not have university education (Panel B). Reported p-values are from Kolmogorov-Smirnov tests of equality of distributions.

Table A.2: Predictors of Perceived Probability of Going to University (0-1) by Probability of Going to Sixth Form

Dependent variable: Conditional Probability of Going to University					
	All	> 10%	> 30%	> 50%	weighted
Female child	0.013 (0.01)	0.014 (0.01)	0.014 (0.01)	0.015 (0.01)	0.013 (0.01)
Age of child	0.002 (0.01)	0.002 (0.01)	0.001 (0.01)	0.002 (0.01)	-0.002 (0.01)
Patience	0.002 (0.00)	0.002 (0.00)	0.001 (0.00)	0.000 (0.00)	-0.000 (0.00)
Risk	0.001 (0.00)	0.002 (0.00)	0.002 (0.00)	0.002 (0.00)	0.002 (0.00)
University (parent)	0.049*** (0.02)	0.048*** (0.02)	0.054*** (0.02)	0.052*** (0.02)	0.052*** (0.01)
Single parent	-0.023 (0.02)	-0.028 (0.02)	-0.015 (0.02)	-0.011 (0.02)	-0.013 (0.02)
Children in HH	-0.002 (0.01)	-0.003 (0.01)	-0.003 (0.01)	-0.003 (0.01)	-0.002 (0.01)
2nd income quartile	-0.014 (0.02)	-0.021 (0.02)	-0.030 (0.02)	-0.036* (0.02)	-0.022 (0.02)
3rd income quartile	0.003 (0.02)	-0.002 (0.02)	-0.006 (0.02)	-0.010 (0.02)	0.000 (0.02)
4th income quartile	-0.001 (0.02)	-0.006 (0.02)	-0.012 (0.02)	-0.018 (0.02)	-0.006 (0.02)
Perceived return (university)	0.020** (0.01)	0.020*** (0.01)	0.019** (0.01)	0.019** (0.01)	0.021*** (0.01)
Consumption value (university)	0.824*** (0.04)	0.826*** (0.04)	0.815*** (0.04)	0.809*** (0.04)	0.819*** (0.04)
Perceived tuition in '000s (university)	-0.001 (0.00)	-0.001 (0.00)	-0.001 (0.00)	-0.001 (0.00)	-0.001 (0.00)
Region and ethnicity FEs	Yes	Yes	Yes	Yes	Yes
R-Squared	0.55	0.55	0.54	0.52	0.52
Sample Mean	0.73	0.74	0.75	0.76	0.77
N	742	739	725	701	742

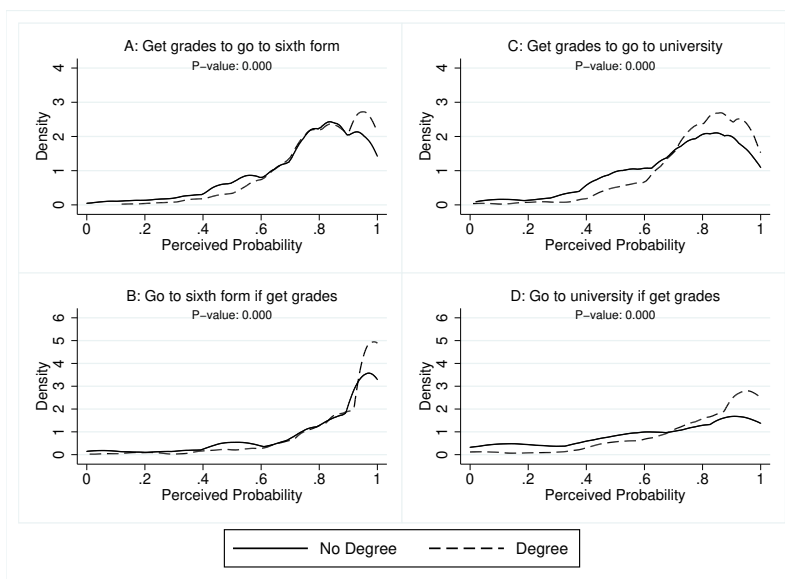
Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The columns report the marginal effects from least squares regressions in which the dependent variable is the perceived probability of going to university conditional on getting the grades. The first column contains all respondents while the following columns only contain those observations who stated at least $X\%$ as the perceived probability of going to sixth form conditional on getting the grades. In the last column observations are weighted by perceived probability of going to sixth form conditional on getting the grades. Controls include a constant, and region and ethnicity fixed effects. *University (parent)* takes the value one if at least one parent has a university degree and zero otherwise.

Figure A.4: Perceived Conditional Probabilities by Gender



Note: Panels depict kernel densities of perceived probability of getting the grades to go to sixth form (A), going to sixth form cond. on getting the grades (B), getting the grades to go to university (C), and going to university cond. on getting the grades (D), separately for male and female students. Reported p-values are from Kolmogorov-Smirnov tests of equality of distributions.

Figure A.5: Perceived Conditional Probabilities by Parental Education



Note: Panels depict kernel densities of perceived probability of getting the grades to go to sixth form (A), going to sixth form cond. on getting the grades (B), getting the grades to go to university (C), and going to university cond. on getting the grades (D), separately for students whose parent have/do not have university education. Reported p-values are from Kolmogorov-Smirnov tests of equality of distributions.

Table A.3: Predictors of Perceived Conditional Probabilities (0-1) using Tobit

	Sixth Form		University	
	Grades for sixth form	Go to sixth form	Grades for university	Go to university
	(1)	(2)	(3)	(4)
Female child	0.058*** (0.01)	0.097*** (0.02)	0.043*** (0.01)	0.090*** (0.02)
Age of child	0.010 (0.01)	0.025 (0.02)	0.012 (0.01)	0.027 (0.02)
Patience	0.019*** (0.00)	0.022*** (0.00)	0.017*** (0.00)	0.023*** (0.00)
Risk	0.009*** (0.00)	-0.004 (0.01)	0.015*** (0.00)	0.016*** (0.01)
University (parent)	0.044*** (0.02)	0.075*** (0.02)	0.047*** (0.02)	0.111*** (0.02)
Single parent	0.055*** (0.02)	0.052** (0.03)	0.011 (0.02)	0.026 (0.03)
Children in HH	-0.008 (0.00)	-0.008 (0.01)	-0.011** (0.00)	-0.009 (0.01)
2nd income quartile	0.043** (0.02)	0.036 (0.03)	0.039** (0.02)	0.031 (0.03)
3rd income quartile	0.074*** (0.02)	0.056* (0.03)	0.048** (0.02)	0.057* (0.03)
4th income quartile	0.098*** (0.02)	0.116*** (0.03)	0.071*** (0.02)	0.132*** (0.03)
Region FE	Yes	Yes	Yes	Yes
Ethnicity FE	Yes	Yes	Yes	Yes
Chi-squared	164.63	125.70	155.55	174.25
Sample Mean	0.78	0.85	0.75	0.73
N	874	874	871	869

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The columns report the marginal effects from Tobit regressions in which the dependent variables are the four elicited conditional probabilities (0-1), respectively. More specifically, the dependent variables are (i) the perceived probability of obtaining the grades in year 11 to go to sixth form in column (1), (ii) the perceived probability of going to sixth form conditional on getting the grades in column (2), (iii) the perceived probability of obtaining the grades in sixth form to go to university in column (3), and (iv) the perceived probability of going to university conditional on getting the grades in column (4). Controls include a constant, and region and ethnicity fixed effects. *University (parent)* takes the value one if at least one parent has a university degree and zero otherwise.

Table A.4: Predictors of Perceived Probability of Going to Sixth Form (0-1) using Tobit

Dependent variable: Conditional Probability of Going to Sixth Form					
	(1)	(2)	(3)	(4)	(5)
Female child	0.097*** (0.02)	0.069*** (0.02)	0.036** (0.02)	0.026 (0.02)	0.025 (0.02)
Age of child	0.025 (0.02)	0.028 (0.02)	0.010 (0.01)	0.022 (0.01)	0.019 (0.01)
Patience	0.022*** (0.00)	0.021*** (0.00)	0.001 (0.00)	0.002 (0.00)	0.003 (0.00)
Risk	-0.004 (0.01)	0.001 (0.01)	-0.011*** (0.00)	-0.007* (0.00)	-0.007 (0.00)
University (parent)	0.075*** (0.02)	0.047** (0.02)	0.036** (0.02)	0.032* (0.02)	0.025 (0.02)
Single parent	0.052** (0.03)	0.027 (0.03)	0.030 (0.02)	0.018 (0.02)	0.018 (0.02)
Children in HH	-0.008 (0.01)	-0.008 (0.01)	0.008 (0.01)	0.005 (0.01)	0.004 (0.01)
2nd income quartile	0.036 (0.03)	0.027 (0.03)	0.003 (0.02)	0.005 (0.02)	0.007 (0.02)
3rd income quartile	0.056* (0.03)	0.076*** (0.03)	0.029 (0.02)	0.062*** (0.02)	0.063*** (0.02)
4th income quartile	0.116*** (0.03)	0.094*** (0.03)	0.049** (0.02)	0.051** (0.03)	0.053** (0.03)
Perceived return (sixth form)		0.015*** (0.01)		0.013*** (0.00)	0.013*** (0.00)
Perceived return (university)		0.056*** (0.01)		0.032*** (0.01)	0.034*** (0.01)
Consumption value (sixth form)			0.765*** (0.05)	0.688*** (0.05)	0.672*** (0.05)
Consumption value (university)			0.147*** (0.04)	0.131*** (0.05)	0.131*** (0.05)
Perceived tuition in '000s (university)					0.002 (0.00)
Region and ethnicity FEs	Yes	Yes	Yes	Yes	Yes
Chi-squared	125.70	140.60	509.07	399.27	393.68
Sample Mean	0.85	0.85	0.85	0.85	0.85
N	874	692	867	689	683

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The columns report the marginal effects from Tobit regressions. The dependent variable is the perceived probability of going to sixth form (conditional on getting the grades). Controls include a constant, and region and ethnicity fixed effects. *University (parent)* takes the value one if at least one parent has a university degree and zero otherwise.

Table A.5: Predictors of Perceived Probability of Going to University (0-1) using Tobit

Dependent variable: Conditional Probability of Going to University					
	(1)	(2)	(3)	(4)	(5)
Female child	0.090*** (0.02)	0.065*** (0.02)	0.026 (0.02)	0.013 (0.02)	0.014 (0.02)
Age of child	0.027 (0.02)	0.027 (0.02)	0.011 (0.01)	0.010 (0.01)	0.010 (0.01)
Patience	0.023*** (0.00)	0.020*** (0.01)	0.004 (0.00)	0.002 (0.00)	0.002 (0.00)
Risk	0.016*** (0.01)	0.020*** (0.01)	0.001 (0.00)	0.002 (0.00)	0.001 (0.00)
University (parent)	0.111*** (0.02)	0.103*** (0.02)	0.058*** (0.02)	0.051*** (0.02)	0.052*** (0.02)
Single parent	0.026 (0.03)	-0.001 (0.03)	-0.019 (0.02)	-0.027 (0.02)	-0.025 (0.02)
Children in HH	-0.009 (0.01)	-0.009 (0.01)	-0.004 (0.01)	-0.002 (0.01)	-0.001 (0.01)
2nd income quartile	0.031 (0.03)	-0.008 (0.03)	-0.008 (0.02)	-0.024 (0.02)	-0.025 (0.02)
3rd income quartile	0.057* (0.03)	0.035 (0.03)	0.019 (0.02)	0.009 (0.02)	0.009 (0.02)
4th income quartile	0.132*** (0.03)	0.076** (0.03)	0.026 (0.02)	-0.002 (0.03)	-0.000 (0.03)
Perceived return (university)		0.059*** (0.01)		0.031*** (0.01)	0.030*** (0.01)
Consumption value (university)			0.920*** (0.04)	0.918*** (0.04)	0.923*** (0.04)
Perceived tuition in '000s (university)					-0.001 (0.00)
Region and ethnicity FEs	Yes	Yes	Yes	Yes	Yes
Chi-squared	174.25	173.93	623.33	567.76	558.30
Sample Mean	0.73	0.73	0.73	0.73	0.73
N	869	753	864	750	742

Notes: Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01. The columns report the marginal effects from Tobit regressions. The dependent variable is the perceived probability of going to university (conditional on getting the grades). Controls include a constant, and region and ethnicity fixed effects. *University (parent)* takes the value one if at least one parent has a university degree and zero otherwise.

Table A.6: Predictors of Perceived Prob. of Going to Sixth Form (0-1) using Binary Returns

Dependent variable: Conditional Probability of Going to Sixth Form					
	(1)	(2)	(3)	(4)	(5)
Female child	0.059*** (0.01)	0.041*** (0.01)	0.019* (0.01)	0.009 (0.01)	0.008 (0.01)
Age of child	0.011 (0.01)	0.014 (0.01)	0.004 (0.01)	0.006 (0.01)	0.008 (0.01)
Patience	0.016*** (0.00)	0.017*** (0.00)	0.000 (0.00)	0.002 (0.00)	0.003 (0.00)
Risk	0.001 (0.00)	0.002 (0.00)	-0.004 (0.00)	-0.003 (0.00)	-0.002 (0.00)
University (parent)	0.039** (0.02)	0.036** (0.01)	0.013 (0.01)	0.013 (0.01)	0.007 (0.01)
Single parent	0.028 (0.02)	0.022 (0.02)	0.015 (0.01)	0.013 (0.01)	0.010 (0.01)
Children in HH	-0.007 (0.00)	-0.008 (0.00)	0.004 (0.00)	0.003 (0.00)	0.001 (0.00)
2nd income quartile	0.035* (0.02)	0.027 (0.02)	0.014 (0.01)	0.010 (0.01)	0.011 (0.01)
3rd income quartile	0.044** (0.02)	0.039** (0.02)	0.027* (0.01)	0.025* (0.01)	0.030** (0.01)
4th income quartile	0.087*** (0.02)	0.080*** (0.02)	0.044*** (0.02)	0.042*** (0.02)	0.043*** (0.02)
Return positive (university)		0.052*** (0.02)		0.010 (0.01)	0.015 (0.01)
Return positive (sixth form)		0.115*** (0.02)		0.094*** (0.01)	0.089*** (0.01)
Consumption value (sixth form)			0.583*** (0.03)	0.562*** (0.03)	0.541*** (0.03)
Consumption value (university)			0.122*** (0.03)	0.116*** (0.03)	0.123*** (0.03)
Perceived tuition in '000s (university)					0.002 (0.00)
Region and ethnicity FEs	Yes	Yes	Yes	Yes	Yes
R-Squared	0.13	0.20	0.48	0.52	0.52
Sample Mean	0.85	0.85	0.85	0.85	0.85
N	874	874	867	867	855

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The results are obtained using least squares regressions. The dependent variable is the perceived probability of going to sixth form (conditional on getting the grades). Controls include a constant, and region and ethnicity fixed effects. *University (parent)* takes the value one if at least one parent has a university degree and zero otherwise.

Table A.7: Predictors of Perceived Prob. of Going to University (0-1) using Binary Returns

Dependent variable: Conditional Probability of Going to University					
	(1)	(2)	(3)	(4)	(5)
Female child	0.074*** (0.02)	0.061*** (0.02)	0.021 (0.01)	0.017 (0.01)	0.018 (0.01)
Age of child	0.020 (0.02)	0.019 (0.02)	0.007 (0.01)	0.007 (0.01)	0.008 (0.01)
Patience	0.020*** (0.00)	0.021*** (0.00)	0.004 (0.00)	0.004 (0.00)	0.003 (0.00)
Risk	0.014*** (0.00)	0.014*** (0.00)	0.001 (0.00)	0.001 (0.00)	0.001 (0.00)
University (parent)	0.096*** (0.02)	0.092*** (0.02)	0.051*** (0.01)	0.050*** (0.01)	0.050*** (0.01)
Single parent	0.016 (0.02)	0.009 (0.02)	-0.021 (0.02)	-0.023 (0.02)	-0.022 (0.02)
Children in HH	-0.010 (0.01)	-0.011* (0.01)	-0.006 (0.00)	-0.006 (0.00)	-0.005 (0.00)
2nd income quartile	0.034 (0.02)	0.028 (0.02)	0.001 (0.02)	-0.001 (0.02)	-0.002 (0.02)
3rd income quartile	0.048* (0.02)	0.043* (0.02)	0.016 (0.02)	0.014 (0.02)	0.011 (0.02)
4th income quartile	0.108*** (0.03)	0.100*** (0.03)	0.021 (0.02)	0.019 (0.02)	0.020 (0.02)
Return positive (university)		0.100*** (0.02)		0.035** (0.02)	0.035** (0.02)
Consumption value (university)			0.811*** (0.03)	0.800*** (0.03)	0.800*** (0.03)
Perceived tuition in '000s (university)					-0.001 (0.00)
Region and ethnicity FEs	Yes	Yes	Yes	Yes	Yes
R-Squared	0.18	0.21	0.54	0.54	0.54
Sample Mean	0.73	0.73	0.73	0.73	0.73
N	869	869	864	864	852

Notes: Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01. The results are obtained using least squares regressions. The dependent variable is the perceived probability of going to university (conditional on getting the grades). Controls include a constant, and region and ethnicity fixed effects. *University (parent)* takes the value one if at least one parent has a university degree and zero otherwise.

B Questionnaire

Introductory Questions:

1. On a scale of 0-10, where 0 is extremely impatient and 10 is extremely patient, how patient would you say you are?

2. On a scale of 0-10, where 0 is never and 10 is always, how willing to take risks would you say you are?

The next set of questions asks you to think about some things that might happen in the future. In many of these questions, you will be asked how likely you think an event is, on a scale from 0% to 100%, where the percentages mean the number of chances out of 100. For example, 0% means 'no chance' and 100% means 'absolutely certain'. You can choose any number between 0% and 100%. Choose whichever number you think most closely fits how likely the event is to happen. Here is a practice question: How likely (0-100%) do you think it is to rain tomorrow? Now some questions about what you think you'll do at the end of year 11.

1. How likely (0-100%) do you think it is you will get the grades to stay in full-time education at the end of year 11?
2. If you get the grades at the end of year 11, how likely (0-100%) do you think it is you will stay on in full-time education at the end of year 11?

For the next questions, please assume that you do get the grades at the end of year 11 and decide to stay on in full-time education.

1. If you do stay on after year 11, how likely (0-100%) do you think it is you would enjoy full-time education in sixth form/college?
2. If you do stay on after year 11, how likely (0-100%) do you think it is you'll do well enough in your future qualifications in sixth form/college to go to university?
3. Assuming you do get the grades in sixth form/college to go to university, how likely do you think it is that you will go to university?
4. If you do go to university, how likely (0-100%) do you think it is that you would enjoy it?
5. If you do go to university, what do you expect would be the cost per year in tuition fees?

Now look ahead to what you might be doing at the age of 25, and imagine how this might depend on the education choices you make.

1. How likely do you think it is that you will be in a paid job when you are 25 if you...
 - ... leave full-time education at the end of year 11?
 - ... stay in full-time education in sixth form/college but not go to university?
 - ... stay in full-time education in sixth form/college and then go to university?
2. If you have a job at the age of 25, what is your best estimate of how much you might be earning if you...
 - ... leave full-time education at the end of year 11?
 - ... stay in full-time education in sixth form/college but not go to university?
 - ... stay in full-time education in sixth form/college and then go to university?